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THE A. I. ROOT COMPANY, Publishers, Medina, Ohio

Editorial Staff

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Editor Home Dept.

Iona Fowls
Assistant Editor

H. G. Rowe
M'n'g Editor

Muth's Ideal Bee Veil \$1.50

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A Superior Quality at Less Cost

We have in New York a complete stock of Apiary Supplies manufactured by **THE DIAMOND MATCH CO.** They are the largest manufacturers in the world who make Bee Supplies."

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Hoffman & Hauck, Inc., Woodhaven, N. Y.

GET OUR PRICES.

HONEY MARKETS

While good crop prospects, together with a depressed market, may look discouraging as to future prices, beekeepers should remember that sugar may be less plentiful next year. Reports indicate that the acreage of sugar beets, as well as sugar cane, is being greatly reduced.

U. S. Government Market Reports.

SHIPPING POINT INFORMATION, MAR. 15.

LOS ANGELES, CALIFORNIA.—Practically no wire inquiry. Supplies heavy, demand and movement slow, market weak. Few sales being made in 60-lb. cans, carloads f. o. b. usual terms, white orange and white sage 12-13½c, white alfalfa 8-9c, light amber alfalfa 6-6½c. Hawaiian, white 7½c, light amber 6c. Due to unsettled market conditions, a large proportion of shipments are consigned to eastern markets to be sold by brokers in less than carlots. Bulk honey is moving a little more freely. Practically no export demand is reported. The heavy recent rains are said to insure a large crop this season. Many producers are still holding last year's crop for higher prices than the present market will pay. Monterey County reports most of the old crop sold, with good prospects for the coming year. San Diego County has some 35 cars still in warehouses. A very high percentage of California honey is now disposed of thru co-operative associations. It is reported that contracts for the new crop are being offered for June-July shipment at very low prices. Sacked beeswax of light color is being sold in less than carlots at 33-35c per lb., dark stock being quoted as low as 26c.

INTER-MOUNTAIN REGION (COLORADO AND IDAHO).—Light shipments of both comb and extracted honey reported. F. o. b. price of 7c per lb. for water-white extracted honey is being quoted out for bulk honey in l. c. l. lots, altho some organizations are holding for higher prices. The inquiry is said to be improving somewhat as a result of lower quotations. The selling of extracted honey thru retail stores is a noteworthy movement. Beekeepers are selling water-white grade in ton lots locally at 6½c per lb., and bright yellow beeswax at 32c per lb. Some beekeepers are discouraged over the outlook for 1921, seeing little chance for securing even the cost of production out of prospective prices.

OTHER SECTIONS.—Texas is reported to be moving some light amber extracted honey at 12-14c per lb. in small lots. Considerable stock is being offered, but demand for it is lacking. 25c per lb. is being paid to beekeepers for beeswax. Some new crop honey is already appearing. Wisconsin is said to be holding best extracted clover for 18c per lb. TELEGRAPHIC REPORTS FROM IMPORTANT MARKETS.

BOSTON.—No arrivals since last report. Comb: Supplies light, little activity but prices holding firm. Sales to retailers, New York, 24-section cases white clover No. 1 heavy \$8.50-9.00, light \$7.00-8.00; Vermont, 20-section cases white clover heavy \$8.50, light \$7.50. Extracted: A few scattering sales in small lots reported. Sales to confectioners and bottlers, per lb., California, white sage 19-20c; Porto Rican, no sales reported. Beeswax: Demand and movement very light, no change in prices. Sales to floor wax, shoe polish, and candle manufacturers, per lb., domestic, light 32-35c; African, dark 16-20c.

CHICAGO.—Car Wisconsin, car Colorado, 3,000 lbs. Idaho, 3,000 lbs. California, 1,500 lbs. Michigan arrived. Market very weak, prices gradually declining, trading slow, local buyers doing very little f. o. b. buying and most stock represents consignments. Extracted: per lb., sales to bottlers, Colorado, Idaho, California, white clover and alfalfa 11-12c, light and dark amber 9½-10c. Comb: Sales to retailers, Wisconsin, Michigan, 24-section cases No. 1, heavy \$6.50-7.00; dark color, light weight and leaky sections \$5.00-6.00. Beeswax, approximately 5,000 lbs. from Oklahoma, Kansas, Missouri and 6,000 lbs. from Central and South America arrived. Market dull, movement slow. Sales to wholesalers, drug houses, electrical houses and harness-makers per lb., Oklahoma, Missouri, and Texas, light 27-32c, dark 26-29c; foreign, best light 25c.

CINCINNATI.—1 car unknown arrived since

last report. Supplies liberal. No jobbing sales of honey reported. Beeswax: Supplies liberal, demand and movement moderate, market weaker. Sales to wholesalers, druggists, and dentists, average yellow 32-38c, mostly 35c per lb.

CLEVELAND.—No arrivals since last report. Supplies moderate, practically no movement of bulk honey except in a limited way to bottlers. Dealers quoted: Extracted, western, white sweet clover, 60-lb. cans in 5 to 10 case lots 16-18c per lb., single cases 20-21c.

DENVER.—Market continues quiet, demand and movement light. Sales to jobbers, extracted, per lb., Colorado, white 13-18c, light amber 12½-16c, amber 12c. Comb: Colorado, 24-section cases No. 1 white, \$6.10; No. 2, \$5.65.

KANSAS CITY.—No carlot arrivals since last report. Supplies liberal, demand and movement slow, market weak on both extracted and comb. Sales to jobbers, extracted: California, light amber alfalfa 10-10½c, extra light amber and white alfalfa 12c. Comb: California, 24-section flat cases No. 1 light alfalfa \$6.65-7.00.

MINNEAPOLIS.—No carlot arrivals. Supplies very light and little prospect of more being bought before the new season. Demand and movement slow, market dull. Extracted: Sales to retailers, bakers and confectioners, western, 60-lb. cans alfalfa and sweet clover mixed light amber 17c. Comb: Sales to retailers, western alfalfa and sweet clover mixed, 24-section cases, very few sales No. 1, \$8.00.

NEW YORK.—Light l. c. l. receipts from New York and California. Practically no demand or movement, market dull, very few sales. Bottlers, bakers and confectioners doing little buying, and practically no activity to market. Spot sales to jobbers, wholesalers, confectioners, bakers and bottlers, extracted: Domestic per lb., Californias, light amber and white alfalfa 7-9c, few high as 10c; white orange blossom and white sage 12-15c, few 16c; New York buckwheat 9-10c. Imported, West Indian and South American refined, per lb., 5½-6½c, mostly 6-6½c; per gal. 60-70c, mostly 65-70c. Comb: No supplies, no sales reported. Beeswax: Domestic receipts light, foreign receipts moderate, supplies moderate, demand and movement very slow, market dull, few sales, little buying being done by bleachers and manufacturers. Sales to jobbers, wholesalers, and manufacturers, South American and West Indian, light, best 26-28c, slightly darker 22-25c, dark 17-18c. African, dark 17-19c.

PHILADELPHIA.—No carlot arrivals. Supplies moderate but meeting practically no demand, market very dull. Very few sales in small lots to bakers and manufacturers, extracted: Florida, 60-lb. cans light amber 11c, amber 9c per lb.; Porto Rican, light amber 68c, amber 63c per gallon. Comb and beeswax, no sales.

ST. LOUIS.—Comb: Moderate supplies, movement very slow, market very dull, lack of demand is outstanding feature. Very few sales to retailers in small lots, Colorado, 24-section cases white clover and alfalfa, No. 1 heavy around \$8.00. Extracted: Receipts very light but supplies liberal, demand lacking. Few sales to bakers' supply houses, large bakers, and wholesale druggists, in 5-gallon cans, per lb., Missouri, Arkansas and Mississippi, light amber various mixed flavors mostly around 14c, dark amber mostly around 12c. Beeswax: Receipts very light, supplies moderate, very light demand, market dull, few sales reported. Sales to jobbers and candle-makers, Missouri, Arkansas, Mississippi, ungraded average country run mostly around 24c per lb.

GEORGE LIVINGSTON,

Chief of Bureau of Markets.

Opinions of Producers.

Early in March we sent to actual honey-producers, scattered over the country, the following questions:

1. What per cent of the 1920 honey crop is still in the hands of the producers?
2. What is the per cent of winter loss of bees, if any, in your locality?
3. What is the condition of the colonies at present as compared with normal? (Give answer in per cent.)
4. What is the condition of the honey plants at this time as compared with normal? (Give answer in per cent.)

This month, the answers of our regular corre-

spondents (whose initials are given) are tabulated as follows:

	On hand.	Loss.	Col. Con.	Plant Com.
Alabama (J. M. C.)	80	2	135	125
British Columbia (W. J. S.)	0	5	100	100
California (M. H. M.)	?	2	100	75
California (L. L. A.)	50	5	100	75
California (F. B. L.)	50	5	100	75
Colorado (J. A. G.)	35	5	95	100
Florida (W. L.)	10	2	100	100
Idaho (E. F. A.)	75	5	100	100
Illinois (A. L. K.)	10	0	125	50
Indiana (E. S. M.)	33	?	100	75
Iowa (F. C.)	5	0	105	70
Kansas (J. A. N.)	0	5	90	80
Louisiana (E. C. D.)	10	25	100	105
Maryland (S. J. C.)	20	5	125	100
Massachusetts (O. M. S.)	10	?	?	100
Michigan (B. F. K.)	5	0	125	80
Mississippi (R. B. W.)	50	15	85	125
Missouri (J. W. R.)	0	10	75	80
New York (G. H. R.)	12	5	100	100
New York (F. W. L.)	3	0	125	75
New York (A. & M.)	43	0	95	25
Ohio (F. L.)	0	0	100	100
Oklahoma (C. F. S.)	10	0	100	100
Ontario (F. E. M.)	5	?	110	?
Pennsylvania (H. B.)	0	5	90	100
Texas (J. N. M.)	0	3	125	75
Texas (H. B. P.)	1	2	100	90
Texas (T. A. B.)	10	5	80	100
Utah (M. A. G.)	10	5	100	100
Virginia (J. H. M.)	5	3	78	95
Washington (G. W. B. S.)	25	4	110	100
Wisconsin (H. F. W.)	10	5	100	?

Special Foreign Quotations.

LIVERPOOL.—With heavy stocks and no export demand, prices are nominal. Sellers at the moment do not report their sales, which must be quite moderate. The value of extracted honey at today's rate of exchange is 6-7c per pound. The beeswax market is still unsatisfactory. The value in American currency is 25-26c per pound.

Liverpool, England, Mar. 2. Taylor & Co.

CUBA.—The price of honey is 60-70c per gallon; wax, 22c per pound. A. Marzol.

Matanzas, Cuba, Mar. 8.

REPORT OF THE FIRST ANNUAL MEETING OF THE AMERICAN HONEY PRODUCERS' LEAGUE. FEB. 15-17.

The delegates from the regular beekeepers' associations and from the allied interests gathered in Indianapolis for the first annual meeting of the League. About 50 persons and some 30 organizations were represented. The president, E. G. LeStourgeon of San Antonio, Tex., gave a report of the actions of the officers. H. B. Parks, acting secretary, reported on the activities of the League up to the present time. B. F. Kindig of East Lansing, Mich., chairman of the committee on education, gave a very full report on the work done in apiculture in the various state schools. The bureau of legislation, represented by C. P. Campbell of Grand Rapids, Mich., gave an account of the activities of this bureau in compiling and presenting a brief to the chairman of the Ways and Means committee of congress, asking that a tariff of not less than 48c and not greater than 60c per gallon be placed on honey. A number of minor activities of this bureau were reported, especially one in which there is a case between a beekeeper and a smelter company in Arizona. The League is planning thru its committees to assist in the fighting of this case.

The most interesting occurrence of the meeting occurred on Feb. 16, when Clifford Muth, chairman of the special advertising committee, reported on its activities. Mr. Muth suggested that we pledge the money for the advertising campaign at once. This met with the approval of those present, and, after many spirited speeches and considerable exhorting on the part of F. W. Muth of Cincinnati, the

following amounts were subscribed: American Bee Journal, \$300; C. H. Weber, \$500; G. B. Lewis Co., \$400; Texas Honey Prod. Ass'n., \$700; F. W. Muth Co., \$500; A. I. Root Co., \$1000; Wesley Foster, \$150; Elyria Enamelled Prod. Co., \$200; Wisconsin Beekeepers' Ass'n., \$200; J. J. Wilder, \$50; Georgia Ass'n., \$100; Michigan Ass'n., \$300; Utah Ass'n., \$500; Indiana Ass'n., \$100; Texas Ass'n., \$100; C. H. Wiley, \$50.

The secretary and the advertising committee were instructed to obtain further subscriptions to the advertising fund, and it is very probable that between ten and twelve thousand dollars will be raised. The executive committee was instructed to place a contract with the Proctor and Collier agency for advertising, which will consist of six one-quarter-page ads in Good Housekeeping, these ads to be backed up by articles on honey in the body of the magazine; also, articles in farm and county papers published by three of the newspaper syndicates. In addition to this a recipe booklet is to be prepared for general distribution in answer to the advertisement. The problem of raising additional funds for advertising was thoroughly discussed. A. L. Boyden suggested that we ask for two per cent of the value of last year's honey crop, and H. F. Wilson of Wisconsin suggested five cents per colony. It was agreed that those soliciting for advertising, ask that the beekeepers tax themselves either one or the other amount.

The officers were re-elected for 1921, and it was announced that the payment of dues made during 1920 would be applied on the present year. The members present expressed a preference that the next meeting be held at Salt Lake City, Utah, and it is probable that the executive committee will sanction this selection. At the close of the meeting, the executive committee held its annual meeting. It was decided that at the present time no charter is needed, as this would necessitate the holding of the annual meetings at some stated place. A brief estimate indicated that it would require at least \$10,000 annually to establish and maintain permanent headquarters for the national secretary. This amount of money can not be raised for this purpose during the present year, but steps were taken towards making arrangements for this important movement.

H. B. Parks was selected as secretary-treasurer of the League for the ensuing year and was required to give a bond in the sum of \$10,000. The committee instructed the secretary to solicit contributions to the general expense fund of the League and to issue another number of the League Bulletin as soon as practicable.

The following State associations have already voted to become members of the League: Michigan, Montana, New York, Indiana, Tennessee, Wisconsin, Illinois, Kansas, Kentucky, Iowa, Nebraska, Texas, Utah, and Colorado; also the Chicago Northwestern Beekeepers' Ass'n., Texas Honey Producers' Association, and the California Honey Producers' Association.

Following is the financial report of Chas. B. Justice while acting as secretary: Receipts—Balance N. B. A. acc't., \$256.90; received from individuals, \$49.50; New York Ass'n., \$21.00; Michigan Ass'n., \$100; Montana Ass'n., \$27; total \$454.40. Disbursements—Expressage, \$3.31; printing, \$11.00; postage, \$4.65; telegrams, \$10.80; stenog. at K. C., \$13.75; photos, \$10; wire to Medina, 70c; B. F. K. bill, \$7.04; stenog. Lamson, \$5; L. S. Gillham Co., \$25; LeRoy Carman Printing Co., ("League Bulletin"), \$235.25; stenog. services, \$50; St. Louis Button Co., \$22.70; postage, \$5; stationery, \$2; total, \$406.24; balance on hand, \$48.16.

Following is the financial report of treasurer since Buffalo meeting: Receipts—Fred W. Muth Co., \$50; Dadant & Sons, \$100; American Bee Journal, \$100; G. B. Lewis Co., \$200; Montana Ass'n., \$1; Utah Ass'n., \$100; Indiana, \$100; Wisconsin, \$100; Tennessee, \$100; Chicago N. W. Beekeepers' Ass'n., \$100; Superior Honey Co., \$10; United States Can Co., \$10; total \$1071. Disbursements—Standard Printing Co., \$25.50; postage, \$20.80; stenographer, \$100; postage, \$13.60; stenographer, \$100; Standard Printing Co., \$230; rubber stamps, 30c; postage, \$8.70; stenographer, \$100; total, \$604.10; balance on hand, general fund, \$466.90; receipts Adv. Fund, F. J. Rettig & Sons for Indiana Ass'n., \$100.

H. B. PARKS, Secretary.

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Bee Books	Queen Rearing Outfits
Bee Gloves	Honey Tanks
Section Honey Boxes	Standard Dovetailed Hives
Bee Veils	Honey Labels
Honey Extractors	Hive Parts
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Bees	Comb Foundation, Airco Brand
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Gleanings in Bee Culture	Capping Melters
Frames	Queens

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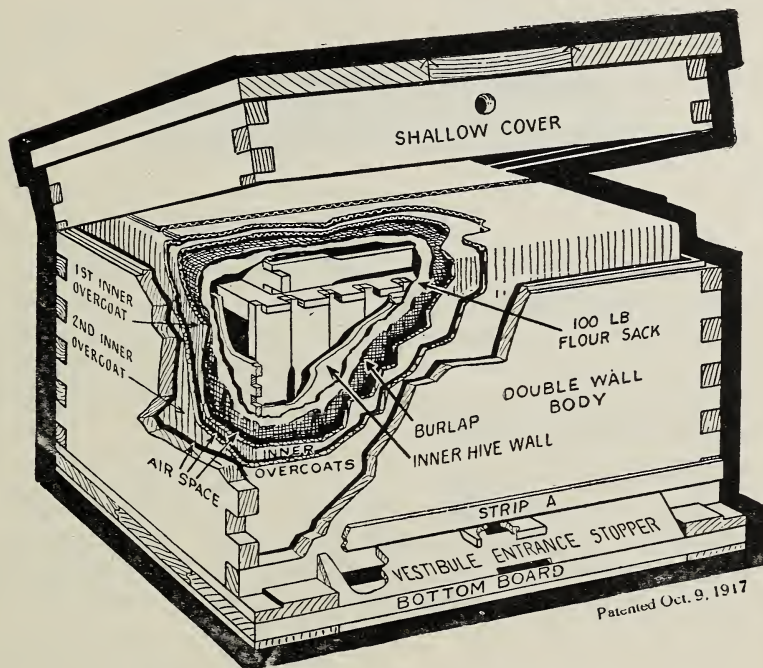


M. H. Hunt & Son

Lansing, Michigan
510 North Cedar Street

Send for 1921 Catalog.

Winter Problem Solved by the Hive With an Inner Overcoat



Furnished with Jumbo depth or Standard Hoffman Frames.

In your purchase of hives for the coming season, consider the fact that, if well taken care of, they should last a lifetime. A lifetime matter is a serious one, and nothing but the best that money can buy should have your consideration. The Hive with an Inner Overcoat is the best on the market as to material, workmanship, and efficiency. The outside wall is made of $\frac{7}{8}$ material, the best for the purpose. Any extra cost over ordinary hives, spread over its lifetime, is very low. The saving in bees, in a single winter, may more than pay for the entire investment. Winter losses in ordinary hives during the winter of 1919-20 in many cases were 75% or more. What a tremendous loss! The Hive with an Inner Overcoat will winter normal colonies, without loss.

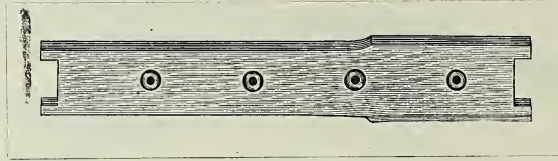
Send for a special circular showing large illustrations. New 1921 illustrated catalog of beekeepers' supplies now ready. Send us a list of your requirements for the coming season.

TIN HONEY PACKAGES

2 lb. Friction top cans, cases of 24.	5 lb. Friction top pails, cases of 12.
2 lb. Friction top cans, crates of 612.	5 lb. Friction top pails, crates of 100.
2½ lb. Friction top cans, cases of 24.	5 lb. Friction top pails, crates of 200.
2½ lb. Friction top cans, crates of 450.	10 lb. Friction top pails, cases of 6.
10 lb. Friction top pails, crates of 100.	
<i>Special prices on shipments direct from factory in the East or West.</i>	
100 5-lb. Friction top pails..... \$ 8.50	Pint Mason Jars, flint glass, per gross \$9.00
200 5-lb. Friction top pails..... 16.00	Quart Mason Jars, flint glass, per
100 10-lb. Friction top pails..... 12.50	gross 10.00

A. G. WOODMAN COMPANY, Grand Rapids, Mich.

Do Not Raise Drones



Wires cut into all-wood frames and lose tension. Portions of honeycomb may sag when wires loosen. Worker brood is not reared in sagged combs parts; drones may be. Honey may clog sagged combs. Smaller crops, increased swarming often result. Eyeletted end-bar frames will help remedy this. Eyeletted frames are made available by Lewis "Beeware."

Wires do not rust at contact with eyelets. Less tension is needed in wiring eyeletted frames. Wires do not cut metal eyelets. **Sold only in packages of frames.** No eyelets or end-bars sold. End-bars have to be specially bored; eyelets fitted by automatic machinery. Furnished only by "Beeware" distributors.

Send for a "Beeware" catalog today. It's free.

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FOR



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HOME OFFICE AND WORKS: WATERTOWN, WIS., U. S. A.

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EDITORIAL

ON PAGE 197 of this issue will be found a report of the meeting held by the American Honey Producers' League at Indianapolis. Among other things done at that meeting was the raising



League Advertising Fund.

of a fund of \$6,000 to help extol the merits of honey as a food, without naming any particular brand or locality. To that end an advertising propaganda in the magazine Good Housekeeping was proposed by one of the prominent advertising agencies; and so favorably was the proposition received that the amount was raised in about 30 minutes. It was suggested at the meeting that the larger beekeeping public, who were not represented at that meeting, would be glad to help swell this fund, and thus make the advertising much more effective. Here is an opportunity for beekeepers, thru their local organization, to help create a better market for honey.



A PROPOSED amendment to the village law of the State of New York, "To regulate and prohibit



Attention Beekeepers of New York State.

the keeping of bees within the village limits," is now in the Senate of the New York State Legislature. Such a law would be clearly unconstitutional since it would abridge the right of citizens of the State to engage in legitimate business. When the far-reaching benefits of the honeybee to horticulture and agriculture in cross-pollination are considered, the beekeeper should not be compelled to beg for an existence, and beekeeping should be fostered by the State rather than hindered by adverse legislation. Every beekeeper in the State of New York, whether he has one colony or 1000 colonies, should write at once to both the senator and representatives from his district, protesting against the passage of this bill and urging the legislators to vote against Senate Bill No. 639, entitled, "An Act to Amend the Village Law in Relation to the Regulating or Prohibiting the Keeping of Bees," if it should be reported from the committee on Affairs of Villages.



DON'T GET alarmed over Government honey-market quotations, even if the clouds



Don't Get Cold Feet.

on the beekeeper's horizon are a little dark just now. There is always a silver lining somewhere. It has been stated that thousands of the sugar-beet farmers, and likewise other thousands of producers of sugar cane, will raise

some other crop this coming season. If that is a fact there is all the more reason for the beekeeper, who can not shift from honey to some farm crop, to stick to his job of producing honey. Furthermore, he should produce more largely of comb honey, which is still commanding a good market. If the sugar-beet farmers and sugar-cane producers have got "cold feet," we beekeepers "should worry." If there should be a shortage in sugar next year, we should worry. We would be very smart to produce all the honey we can. The man who gets "cold feet," and gives up now, is very short-sighted, to say the least.

Above all things just now, when the bees are rearing brood so early, beekeepers should watch their colonies closely to be sure that none of them run short of stores.



THE REMARKABLY mild weather during February and early March has afforded beekeepers a splendid opportunity to note the



Early Brood Rearing.

variations in the beginning of brood-rearing under different colony-conditions. As a rule, winter brood-rearing is undesirable, and it is well to note just what conditions favor the postponement of brood-rearing.

Usually the colonies which are wintering the very best are the ones which begin spring brood-rearing latest. Such colonies, being quieter during the winter, are willing to continue their quiescence longer. Weak colonies usually begin brood-rearing earlier than stronger colonies. Colonies having old bees usually begin brood-rearing earlier than colonies having younger bees. Colonies that are restless because of a nervous temperament usually begin brood-rearing earlier than colonies of a quieter temperament. Colonies which are frequently disturbed are more inclined to begin brood-rearing early than those undisturbed. Colonies which have wintered on poor stores usually start brood-rearing earlier than those wintered on better stores. Colonies exposed either to very low or very high temperatures usually begin brood-rearing earlier than those in a moderate temperature. In this connection it has long been known that colonies of normal strength wintering well in cellars may postpone brood-rearing until after they have been placed on their summer stands.

The outstanding feature in all of these is some form of disturbance. Whether it comes from colony weakness, temperament, age, mechanical disturbance, poor stores, or temperature, the quiescence of early winter is finally upset and brood-rearing is begun.

Reports coming to this office indicate that in many cases the bees began rearing considerable brood in the cellars this year, some time before being put outside. This was probably brought about in some cases by the lack of a proper cleansing flight before being put into the cellars last November, as mentioned on page 10 of our January issue, and in other cases by the cellars being too warm during the winter. In many cases, no doubt, both of these disturbing factors have been at work, thus hastening the beginning of brood-rearing.

Just what effect this early brood-rearing will have upon the condition of the colonies later will depend largely upon the weather from now on. If no severe cold weather occurs later and if the bees rear brood only moderately in the North during April, no serious damage may be done except the using up of an excessive amount of stores.



IN PARTS of the northeastern United States where temperature conditions are favorable for the clo-



Liming the Soil and Its Effect on Beekeeping.

vers, the soil is so deficient in lime that the clovers do not do well. In some regions when the soil could no longer support a growth of clover, farms have been abandoned because of the poverty of the soil. Within recent years many of these abandoned farms have been built up, and good crops are now being raised largely thru the use of lime and the growing of clover.

Extension men from the agricultural colleges are now preaching the doctrine of liming the soil. County agents and farm bureaus are not only telling farmers that it pays to lime the soil, but demonstrations are being made on farms here and there to show the great value of lime. As a result of all this, great areas in eastern Ohio and parts of New York and Pennsylvania, outside of the buckwheat region, which were formerly poor territory for beekeeping, are now becoming good beekeeping territory on account of the return of the clovers. The practice of liming the soil spreads from farm to farm, as neighboring farmers become convinced that it pays, until large areas of good clover territory spread from these centers where liming was begun several years ago. In most of these regions alike clover has already been introduced and when once it gets into a locality it stays, if conditions are at all suitable, springing up in meadows, along roadsides and in fence corners.

Beekeepers in these regions will do well to find out where the most lime is being used by the farmers, as a guide in locating outapiaries, for where farmers are using a ton or more of ground limestone to the acre, beekeeping should flourish, if other conditions are at all favorable.

In this connection many beekeepers have noticed how much better the clovers grow along roadsides when the road is paved with crushed limestone, as a result of the worn away particles of the stone being distributed over the soil adjacent to the road.

In those regions where the soil is deficient in lime, beekeepers can improve their locations by seeing to it that the farmers of their vicinity are supplied with the best information available on the subject of liming the soil. Literature on this subject can be obtained from the various state experiment stations and agricultural colleges as well as from the United States Department of Agriculture at Washington.



ON PAGE 208 of this issue E. R. Root estimates the amount of honey used by a colony



Honey Used by a Colony During the Year.

of bees for its own maintenance at 200 to 250 pounds per year in the southern States. This is the amount the bees must have before any surplus can be secured. While this amount may seem excessive to some, it is not so high as similar estimates made by others. The data which are available on this subject are meager, but they all indicate that surprisingly large quantities of honey are used by the bees during the active season.

Beekeepers have no means of knowing exactly how much it costs in honey for the bees to rear a given amount of brood, and we can only guess as to the amount of honey used by adult bees when they are active as during a honey flow. Some work done by R. L. Taylor in the Michigan Experimental Apiary in 1896 yielded figures indicating that four pounds of honey are used to produce a frame of brood, Langstroth size. These figures were obtained by carefully conducted experiments. Mell Pritchard reports that, in his queen-rearing operations, he feeds his cell-building colonies, after the honey flow, one quart of sugar syrup made of two parts of water to one part of sugar, which is about the equivalent, in sugar content, of a pound of honey. This causes the bees to rear brood at the rate of five frames of brood every 20 days, these five frames being removed from the brood-chamber every 20 days and placed above a queen-excluder. Five combs every 20 days is at the rate of one comb every four days, to produce which he feeds the equivalent of four pounds of honey. If no nectar is coming in from the fields, these colonies use a small amount of their reserve stores in addition to the quart of thin syrup per day. These figures agree closely with Taylor's figures of four pounds of honey to produce a frame of brood.

In 1901 Adrian Getaz collected all of the data which had been published up to that

time in American beekeeping literature on the subject of "feeding back" extracted honey for the completion of unfinished sections. These figures indicate quite consistently that a colony of bees, when actively engaged in storing comb honey in sections, uses one and a half pounds of honey daily. In practically every recorded case brood-rearing was restricted, while the colonies were being fed, by reducing the brood-chamber to five combs. From this great mass of figures on feeding back Getaz concluded that 170 pounds of honey is the lowest amount consumed by a normal colony during the year.

Disregarding the brood reared previous to about April 1 and assuming that a colony rears two frames of brood during the first period of 21 days, five frames of brood during the second period of 21 days, and 10 frames of brood during the third period of 21 days, we have a total of 17 frames of brood, which, according to the above figures, cost 68 pounds of honey. Some colonies will probably produce 20 combs of brood in this time, costing 80 pounds of honey. This takes the colony up to about the first of June. Assuming an average of five frames of brood thru July and August, we have 15 frames of brood costing 60 pounds of honey. Assuming three frames of brood thru August and September we have nine frames of brood, or a total of 164 to 176 pounds for brood-rearing alone. To this must be added 15 to 20 pounds for winter and the amount of honey used by the adult bees when they are active during a honey flow. On this point we have but little information; but, if the above figures are nearly correct, normal colonies of bees must consume more than 200 pounds of honey annually, even in the North.

The large amount of stores needed for brood-rearing during the spring, in some cases apparently as much as 80 pounds, emphasizes the need of close attention as to stores during this time when the bees may not be able to gather much from the fields.



IN THOSE areas in which both American foul brood and European foul brood are



The Sequence of Brood Diseases.

often found in the same apiaries, some beekeepers actually believe that one of these diseases turns into the other. So strong is this belief in some places that it is often discussed in beekeepers' meetings; and the idea has even crept into some of the bee journals, thus unfortunately adding to the confusion already existing in the minds of many beekeepers who have to contend with both diseases.

It should not be necessary to call attention here to the fact that the cause of each of the two most destructive brood diseases is positively known, the cause of American foul brood being a specific germ *Bacillus larvae* (White), and the cause of European foul brood being an entirely different germ,

Bacillus pluton (White). The work of Dr. White in the investigation of the cause of these brood diseases has been verified by Sturtevant as well as other investigators; so there can be no reason for doubt as to its being correct. For *Bacillus pluton* to change into *Bacillus larvae* is just about as impossible as for wheat to change to corn, or tomatoes to change to apples.

Why should such a belief become prevalent among beekeepers? What could they have observed that could possibly lead them to such a conclusion? The explanation is found in the difference in the behavior of the two diseases.

European foul brood is usually at its worst in the spring, often disappearing later in the season, so that sometimes its presence can not be detected in the apiary even by a careful examination of the combs; while American foul brood persists thruout the season, usually growing worse as the season advances. European foul brood usually spreads with surprising rapidity thruout the apiary during the spring; while American foul brood, if not checked by the beekeeper, spreads slowly but surely thruout the season, especially during the robbing season. European foul brood is more destructive to weaker colonies, since strong colonies, especially if Italians, are better able to resist it; while American foul brood destroys the strong as well as the weak, often being found first in the strongest colonies.

When both diseases are present the beekeeper sees chiefly European foul brood during the spring and chiefly American foul brood during the fall, altho both diseases may be present thruout the season. The variation in the symptoms of European foul brood, by which it sometimes closely resembles American foul brood in appearance at first glance, may lead the beekeeper to think that he has only European foul brood in the spring, and the disappearance of the characteristic symptoms of European foul brood later in the season leads him to believe that he has only American foul brood left. If he send a sample to the Bureau of Entomology at Washington for examination in the spring when his trouble is overwhelmingly European foul brood he is almost sure to select a sample of this disease; and, if he sends another sample in the fall when European foul brood is difficult to find, he is almost sure to send a sample of American foul brood.

When both diseases are present a bad case of spring dwindling, following poor wintering, may be diagnosed as "disappearing disease." The colonies thus weakened become easy prey for European foul brood. Even with this handicap the colonies may build up during the honey flow and clean up the European foul brood to a large extent, so that later in the season the beekeeper sees only American foul brood. Noting this sequence of evils the beekeeper may be led to the erroneous and absurd belief that one disease turns into another.

AT the beginning of the active season it may not be out of place to consider some of the principles of colony control for necessary manipulations of combs and hive parts. For the comfort of the operator and for speed and efficiency, a thorough understanding of colony defensive behavior of honeybees is of the utmost importance; yet I cannot recall that this subject has taken any important place in the literature of beekeeping. It is more with a view to stimulate research than with the idea of telling anything new that I am presenting the following rough outline of the subject as it appears to a practical beekeeper.

First, the honeybee colony is never unguarded. There is no time when a hostile act does not produce a defensive reaction in a normal colony of bees. This varies with the condition of the colony, mainly from temperature, from a sullen buzz-z-z to a sally of scores or hundreds of armed guards. Hostile acts may be vibrations or sudden jars, quick motions in the sight of the guards, the opening of the hive, or the intrusion of foreign objects into the hive or in front of the entrance. The latter includes the activities of would-be robber bees.

Second, comparatively few individuals in the colony act as guards; but these few appear to be self-constituted, and take up defensive activity wherever the hostile stimulus occurs. The vast majority of the workers pay no attention to any but the most serious disturbances. If the stimulus is continued, more and more guards come to the attack until the excitement may spread to practically the whole colony.

Third, races of bees and individual colonies vary greatly in defensive behavior. Italians are, as a rule, much more gentle under the hand of an experienced beekeeper; on the other hand, they defend their hive more vigorously against robber bees. Perhaps the confidence with which they remain quiet under inspection is the same as that with which they kill persistent robbers, and it may be that the panic with which blacks run helter-skelter off the combs is the same fear which makes them easy marks for thieves of their own kind.

Fourth, young bees seldom sting, and the guards are usually older. Bees well filled with honey seldom volunteer an attack; but, when returning from the field with a light load or when carrying pollen, they are often much inclined to attack. A queenless and broodless colony defends itself poorly against robber bees.

Fifth, a normal brood-chamber is defended more vigorously than a super of honey. Bees will fight for open brood more quickly

COLONY CONTROL

Some Important Facts Concerning the Behavior of Bees in the Defense of the Hive

By Morley Pettit

ly if the latter are fresh from the extractor. If the operator is slow in getting the hive closed after adding either of these and gives the guard-bees time to come up thru in force, he is in for a good stinging almost in spite of all the smoking he can do. This seems to hold even tho one or more supers of honey may intervene between the newly added super and the brood-chamber. If a comb of brood and a comb of honey are left outside the hive with their adhering bees, the latter will guard the brood to the extent of stinging all comers, but may in a few moments be brushed from the honey without offering resistance. Before bee-escapes were introduced we used this principle in removing honey whenever there was sufficient flow to prevent robbing.

Sixth, the effects of various other conditions on defensive behavior are almost endless and are of great importance in practical bee management. In general a colony is more gentle when the temperature is high and the light is the brightest. Colonies in the sun are easier to manipulate than those in the shade at the same time of day. This is one strong argument against the use of shade in the apiary. It is the rule, practically without exception, that as we go down a row of hives, handling the sunny ones without difficulty, we can look for trouble as soon as we come to a hive that is shaded. To use common apiary language, they are mean, unreasonable, and—so on. On cloudy days resistance is always greater, and if it is just too cool for bees to fly, or if it is raining or has just been raining, it is simply awful. Not only is resistance greater, but the quieting effect of smoke is much less. This is often explained by the statement that on such occasions the old cranky field bees are all home; but, when we remember our second observation that comparatively few bees act as guards, we wonder how true an explanation this may be. It may be that the guards simply reflect the spirit of the hive, and that this spirit is tempered by the sum of the individuals which happen to be at home at the time. But that does not explain the case of the shaded colony which is storing just as rapidly, and presumably has as many fielders out as the ones in the sun. Often a weak colony puts up a hot, unreasonable resistance to examination, and such colonies will often refuse all the skill and blandishments of the beekeeper to introduce a queen, or to add more bees by ordinary uniting methods. It is notable in our experience that queens

than for sealed brood and for open honey more quickly than for sealed honey. A special case here is that of a super of foundation or empty combs, especial-

are more easily found in average colonies than in those which are below average strength. No doubt, she is more easily frightened into hiding where there are not so many bees.

Colonies are the most gentle of the whole season during the fine days of spring, doubtless because of the larger percentage of young bees. As the season advances they seem to grow more sophisticated, lose faith in man, and resist more vigorously from week to week his interference in their affairs. Colonies may be made bad-tempered by teasing or bad management; and, conversely, it would seem as tho a whole apiary grows better-natured by having frequent visits from people who know how to avoid irritating them. I have in mind a case where one lot of hives was divided in spring between two locations. One was without shade, near a dwelling, where the lady of the house who loved bees often sat among the hives to do some mending or similar work. The bees remained gentle all thru the season. The other was in an old orchard far from any occupied house. Cattle were pastured in the same field and no doubt disturbed the even temper of the colonies considerably. No one went near the hives except the beekeeper and his helpers, who gave each yard the same weekly attention. These bees became more and more cantankerous as the season advanced. This shows how the temper of bees may be developed in opposite directions by different environments, altho they are originally the same stock and receive the same care and attention from the beekeeper.

During a good honey flow colonies are usually most gentle and easily handled. As the flow cuts off they become cross. What makes the difference? Is it the robber bees which come picking around the entrances and keeping the guards constantly alert? The fact that the presence of numerous openings in old hives, which give robbers a better chance, makes the bees much crosser even tho no robbing actually occurs, would bear out this idea. No doubt the presence of fresh nectar in everybody's honey sac makes all hands good-natured; and conversely, the empty stomachs and the daily search for honey which is unrewarded set the colony nerves on edge. Whatever be the explanation which some scientist will no doubt give us in due course, we all know that everything runs more smoothly in the apiary during a good flow.

Applications in Practice.

Now what has all this to do with practical beekeeping? No doubt all commercial beekeepers have quit reading before this, so I will address the amateurs and beginners who may still be in the audience. The control of a colony of bees may be compared to the control of a nervous horse. The smoker represents whip and lines. One is needed as much as the other. With long practice it may be possible to drive a horse

without lines, but it is not practical any more than to handle colonies without a good smoker. The latter must be ready to give a good full cloud of white cool smoke at all times. A good horseman lets his horse feel whip and bit just enough to know it has a master, and no more. He uses his control (whip and lines) just as much as the mood and disposition of the horse require, and no more. Directions are sometimes given like the following: "To open a hive blow smoke in the entrance, then raise the cover and drive some smoke in between the frames." This advice is given without any regard to the needs of the particular case. Did you ever hear a novice driver advised as follows: "On taking your seat in the carriage give the horse three vigorous jerks on the bit and cut him sharply around the body twice with the whip." Some horses might require such treatment on some occasions, but to make a rule of treating all horses in this way would be inconvenient at times. Bees are quite as nervous as any horse ever was, and will respond to gentle or rough treatment just as readily. It is necessary to keep the colony completely under control from the time the cover is removed until it is replaced. The amount of smoke required to do this will depend on all the conditions which have been very roughly outlined above—and several more. What smoke is used should reach the guards as a cool cloud, not as a blast. Smoke blown upon bees will excite them, when the same quantity of smoke reaching them without perceptible current or blast causes them to forget their resentment and go quietly about their business.

Smoking at the Entrance.

When conditions are favorable for good-tempered bees we seldom smoke the entrance at all. It disarms the entrance guards, increasing the danger of robbing, and excites the bees needlessly. If the queen is to be found, one might almost as well close up and go on to the next hive after smoking the entrance. She is very easily frightened into hiding, which makes it almost impossible to find her. If the frames are covered with a cloth they can be uncovered almost without jar, which is one great advantage of the cloth. At first, only a few bees nearest the light become guards and advance to the defense. A gentle cloud of dense smoke over the top-bars sends them back. Combs may then be removed and examined in turn. Perhaps every minute, or oftener depending on conditions, some guards lift their wings in an alert manner and require the gentle yet dense cloud of smoke to envelop them and cause them to subside. It takes experience and close watching to know just when the smoke should be used. If used too often all the bees become excited and run about, the queen cannot be found, and no work in that hive can be done with comfort. If left too long the guards dart at the operator, sting him, and he may lose his nerve and beat a

hasty retreat. Then the fat is surely in the fire. On his return he is met by an angry mob which seem to know they have beaten him out, and it may be necessary to smoke them most unmercifully to get the colony in subjection again. Isn't that a lot like a horse? They are likely to remember you next time you come around, too.

As the season advances we find it necessary to use more and more smoke, altho we always use about as little as will let the colony know who is boss. One of the drawbacks of commercial beekeeping is that we cannot choose the most favorable time of day or weather for colony work. With apiaries crowding one another for attention, the work has to keep moving right along, no matter whether it is bright or dull and sometimes even when it rains. The manner of using the smoker has to make up for the difference.

Why Does Smoke Quiet the Bees?

Very often at bee-demonstrations the question is asked, "What does the smoke do to the bees, what effect does it have on them?" I think the answer invariably given by the experienced beekeeper who is demonstrating, is something like this: "It causes them to fill themselves with honey, and bees in that condition do not or cannot sting." He may then show the questioner some bees on the comb he is holding actually filling themselves—and both are satisfied. But is that really the answer? Ask the same beekeeper about some manipulation which requires having all the bees filled, and he will explain that it takes at least 20 minutes of smoking and pounding on the hive to accomplish this. Yet in that time he would have subdued and examined thoroughly three or four colonies, without any thought of waiting for them to fill themselves. Take

again the case of a swarm which has hung on a limb overnight until its guards are quite snappy; they are easily subdued with smoke when it is impossible for them to fill themselves, for lack of any source of honey.

Then what is the answer? That is for a physiologist to say. I would guess that the smoke causes irritation to some of the sense organs of the bee and draws its attention away from the intruder—it was about to drive off. Since the defense of the hive is left to a comparatively few guards, that is enough to disorganize the defense and so keep the colony in subjection. The disorganizing principle is used more or less vigorously in some methods of uniting and introducing queens. The mildest type is the method where under favorable conditions a queen may be run in at the entrance, followed by a puff of smoke to disarm resistance of the entrance guards. A more vigorous form is the "smoke method" where the colony is confined entirely to the hive after receiving three strong puffs of smoke, and the queen run in at the saturation point of colony distress and disorganization. A more cruelly drastic method, which I have not seen recommended for many years, is the use of tobacco smoke to actually stupefy the bees before introducing the queen. Of course the attitude of the queen, whether one of fear or confidence, has a lot to do with the success of introducing methods. On the other hand, the different types of introducing cages seek to deliver the queen in the brood-nest under conditions which will not arouse any suspicion of her as a hostile element. However, a full discussion of introducing and uniting methods would add too much to the length of this article and may well be reserved to a future time.

Georgetown, Ont.



O H, this beastly weather! will it ever let up? these never ending colds? these snuffs and snorts? Would that I could go where it is not cold, and where I could breathe thru my nose, and without catching cold!"

I wonder how many of our readers located in the North, suffering from the extreme cold, have not said this, and wished time and again they were in a milder climate, or that spring and summer would come. Almost daily we get letters from beekeepers who say either they or some member of the family can not stand the cold, and want us to tell them of some good bee locations in the South. With the view of helping these peo-

THE CALL OF THE SOUTHLAND

Some of the Difficulties of the Country

By E. R. Root

ple, and even others who for various reasons, would like a change, I may be able to offer some suggestions.

In the first place, let me

make it clear that sometimes one will suffer more severely in the South from chilly air than he will in the North, where he can get near a stove or a steam radiator. While the winters in the South are very mild, there are days all thru the Southland, and in California, that are decidedly unpleasant, damp, and chilly, and when an overcoat affords none too much warmth, and where a fireplace indoors allows one to bake himself on one side and almost freeze on the other. While it is not very cold

in the South, there are many days there when the temperature is down to 50 degrees, and even slightly below freezing. During these times I think one will suffer as much as or more than he will in the North when the temperature is down to zero with a dry atmosphere. But it is fair to say that the greater part of the days in the South are very comfortable; and the further south one

North to carry them thru from one main honey flow to another. Almost constant breeding wears out the queens so that they are seldom good for anything after the first year; and in some localities in the South the time will come, I think, when beekeepers will discover that it will pay them to re-queen twice a year.

In going south one should remember that



Fig. 1.—A typical gallberry and blackberry country, stretching from North Carolina to Louisiana. The blackberry yields a dark-colored honey of inferior flavor; but it is invaluable for boosting brood-rearing.

goes, the more it is like summer in the North.

Many of the readers of this journal are interested in knowing what they can do with bees in a warm climate, and would like to know the sources of honey, and whether it is possible to make a living. As to the last I can say yes and no.

As I have often said before in these columns, one must take time not only to acclimate himself but to learn that bees must



Fig. 2.—This picture was taken thru the wind-shield of a Ford automobile that was "fording" the so-called road lengthwise. On either side of this road are gallberry, blackberry, high and low bush huckleberry, tupelos, black gums, and dozens of other honey plants.

he will not see much white clover; and what there is, is of but little value. Starting from Virginia and North Carolina he will find growing on the coastal plain near and up to a hundred miles from the coast, gallberry, tupelos, black gums, blackberry, high and low bush huckleberry, and titi. Thru Virginia, North Carolina, South Carolina, Georgia, and Alabama, much of the territory along the swamps, rivers, and bays is acid,



Fig. 3.—The banks of the Roanoke almost its entire length are covered with honey-bearing flora, mainly tupelos and black gums with some gallberry and blackberry. The apparatus shown close to the shore is an automatic fishing machine for catching herring.

be handled somewhat differently. While they do not freeze to death in the winter, I will venture to say that there are more bees that die in the Southland from starvation and what we might call spring dwindling than actually die of winter cold in the North. Moreover, bees there require twice or three times the amount of stores necessary in the



Fig. 4.—Charles Duvall, of the Duvall & Leggett Co., Williamston, N. C. He is looking at several of his comb-honey supers during the second week of April, when the editor was at his apiary. It is honey from hawthorn and crabapple largely.

so that the white clovers can not grow. But this very acid condition is favorable to the growth of the gallberry—a very welcome substitute for white clover, that requires a sweet soil. This same sour soil, so favorable to the growth of gallberry, is likewise unfavorable for the growth of the malarial mosquito. If it were not for this condition

no white man would be able to live in this swamp country.

The very best honey found on this coastal plain is undoubtedly the gallberry when it is free from titi or honey from any other source. A pure gallberry honey, say those

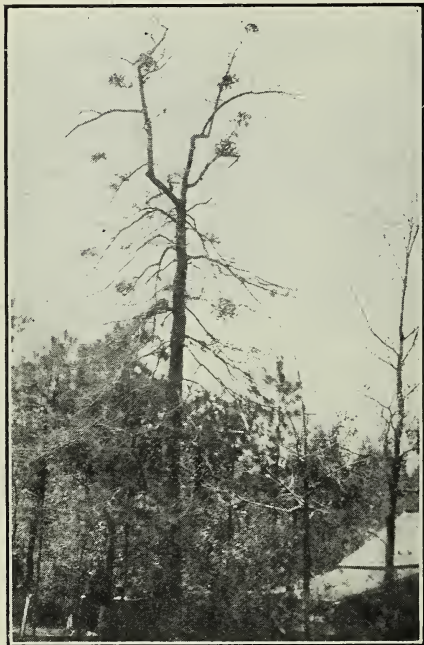


Fig. 5.—A fine specimen of highland black gum in North Carolina.

who ought to know, is almost an exact duplicate in body, color, and flavor of white clover; but, unfortunately, a pure gallberry honey rarely reaches the northern markets. Other honey sources are so mixed with it that its quality is greatly impaired. Those who ought to know, again, say it is possible in most of the sections where it grows to produce a pure gallberry honey for the northern markets, and such honey could be used by the bottlers and canners in place of white clover. If the contents of the bottle or can are labeled "Honey" the northern honey-eating public will accept gallberry as readily as white clover, because it has a flavor they are accustomed to, and therefore they like it.

Next in order of quality are the black gums and tupelos. While these are beautiful white honeys they have just enough "difference" so that the housewife of the North does not accept them as she does the gallberry or the white clover. Then comes titi, which has an off flavor, and should never be allowed to be mixed with gallberry. It should be sold to bakers and manufacturers. The same might be said of blackberry honey,

which is decidedly dark-colored, and of medium flavor.

One of the very best sources of honey is the partridge pea of northern Florida. This is a good honey, but it does not begin to compare with gallberry.

Another important source of honey in northern Florida is the "summer farewell," and some seasons along the rivers and bays the mangroves. Saw palmetto and scrub palmetto yield a very fine-flavored honey; but it seldom reaches the North, as most of it appears to be consumed in the South.

Thru the central portions of the southern tier of States, or what is usually called the Piedmont section, are cotton, a little clover, some crimson clover, and fruit bloom. In the mountain section will be found the poplars, sourwood, and other tree honeys, as well as fruit bloom.

While the coastal-plain country is not developed, it is unquestionably the portion in the southeastern States that is the best for bees; and any one desiring a milder climate and a good bee country, and can stand the swamps and mosquitoes, will find this the place to which he may go.

One will find a market for practically all the honey he can produce in the South. If climate or health is a matter of consideration one should make up his mind that his bees will have to gather from 200 to 250 pounds of honey for colony maintenance before he can get a surplus. So much honey is

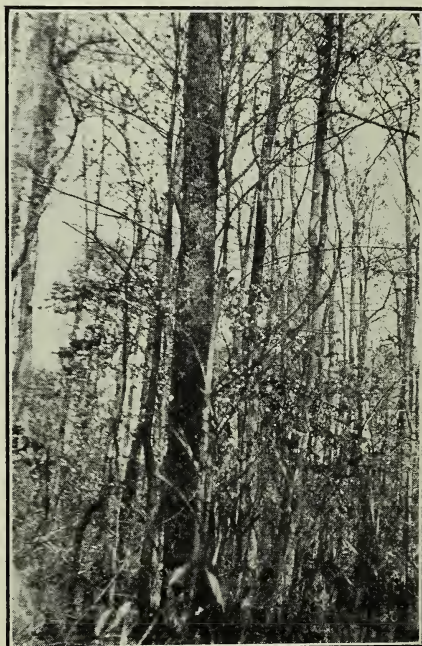


Fig. 6.—A typical white-tupelo wood with one fine specimen in the foreground. This is on swamp land.

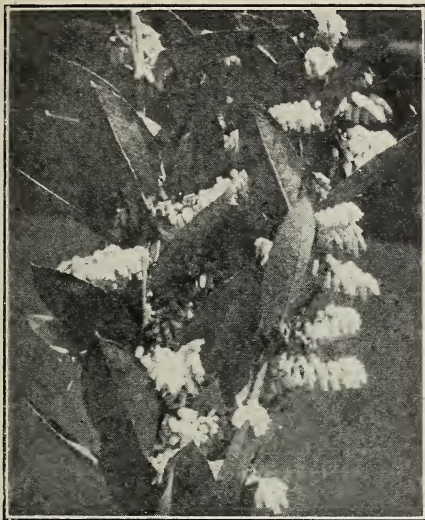


Fig. 7.—The plant and blossoms of the titi. This yields an inferior honey and a large quantity of it. Unfortunately, it is often mixed with gallberry and other honeys of good flavor.

consumed in constant brood-rearing and flying every day for 11 or 12 months that the beekeeper of the Southland should figure on at least two or three pounds of honey to maintain a colony to every pound he will get for surplus. In many instances the ratio would stand four to one. In the far southern States some of the best beekeepers admit that, during the winter, their bees have to raise two or three families of brood before they can get a family to gather the honey. That means that the hive will have to be filled with brood two or three times, each generation dying off before the third or fourth generation can gather the main crop.

On the other hand, northern bees, during winter for five or six months, are in a semi-dormant state, during which they raise but little brood, consume very few stores, and last, but not least, require no attention.

There are wonderful opportunities in this southeast section of the Southland; but unless the beekeeper can adapt himself to the conditions he will make a mistake by moving from the North to the South.

After having been editor of *Gleanings* for the last 36 years I have come to this definite conclusion: Barring some exceptions, the average beeman will do better in a locality where he has spent most of life than he will to move

to some other locality where the conditions are radically different. It really takes years to learn a locality; and I have observed many and many a time that the new beekeeper moving to the South is at a very great disadvantage compared with a man who has lived in the Southland all his life. So I say, stay where you are unless your health or some other consideration absolutely demands a change. From a financial point of view you will, the first year or two, lose money.

I have come to the conclusion that most localities in the United States have their decided drawbacks as well as their good features. It is the drawbacks that the tenderfoot, or new man, encounters that put him to a great disadvantage. Yes, I think the greater the bee country the greater are some of the obstacles to be overcome, and this is particularly true of southeastern United States and in California.

In California particularly, especially in the southern part, European and American foul brood are rampant. Both diseases have obtained an awful foothold, as brood-rearing can progress there more or less all the year.

While California is a wonderful bee country, producing more carloads of honey than any other State, there are more failures and partial failures of the honey crop there than elsewhere. However, good beekeepers are making money there.



Fig. 8.—A dense mass of gallberry bushes. This plant yields honey that is practically a duplicate in body, color, and flavor of white clover. The blossom that yields the honey is a small raylike flower about $\frac{3}{8}$ inch in diameter. The honey from it is so superior that, when the plant begins to yield, the bees will leave white-tupelo that may be secreting nectar so abundantly that the little transparent globules of nectar may be seen in the blossom along the roadside, and seek the gallberry.

FRUITS vary in their necessity for cross-pollination from complete self-sterility to self-fertility. Some of the best-known commercial varieties

of apples, pears, cherries, etc., are entirely dependent on pollen from other flowers. Even in case of self-fertility it has abundantly been demonstrated that more perfect fruit results from cross-pollination than from self-pollination. Bees, either the many native wild species or the hive-bee, are the most important agency for carrying pollen from flower to flower. From the point of view of fruit-growing, therefore, every thing possible should be done to propagate bees, particularly the honeybee.

Progressive fruit-growers appreciate the importance of bees in setting a crop of fruit and commonly rent colonies of bees for the blossoming period, paying \$5.00 per colony and allowing one colony to each acre or two of orchard. The increasing custom of growing a honey-producing cover crop would make the combination of orcharding and beekeeping particularly desirable, were it not that some fruit-growers overdo their spraying so as to allow spray poison to drip from the trees. This poison, falling to the blossoms of the cover crop, is taken up by the bees and has resulted in the destruction of so many bees as to cause commercial beekeepers to move away to safer zones.

In return for their good services many bees meet a pitiful death at the hands of those they help. For two or three days after the spraying of an orchard nearby bees frequently die in numbers. The field force first is depleted, either failing to return or sometimes bringing into the hive sufficient poison to spread agony and destruction to brood and nurses. Many colonies of bees have been completely exterminated. Others have been so harmed as to fail to build up even in time of full honey flow and later succumb to disease and winter-kill. Instead of producing honey these colonies must be fed that the remnant survive.

Source of the Poison.

Bees secure poisonous fruit sprays as a result of the following improper horticultural practices:

- a. From the drip upon honey-producing cover crops grown under the trees. This is the fault of excessive application.
- b. From spray reaching fruit bloom. This is the fault of spraying too early, before the blossoms have dropped.
- c. From spray mixing with honeydew, the excretion of plant lice. This is the fault of neglecting to keep plant lice under control.

Another doubtful source is from foliage before the spray has dried. This is insignificant as compared with the others, on which

SPRAY POISONING

How the Bees Obtain the Poison and How This Can be Avoided

By Dr. A. L. Melander
State Entomologist of Washington

it is largely consequent. Bees would not frequent the orchard if there were no honey available.

Symptoms of Spray Poisoning.

Arsenic is a quick-acting poison; hence those bees that secured a full toxic dose fail to return to the apiary. Countless dead bees have been noticed between the orchards and the apiary. Especially about their watering places do the bees congregate, visiting moist ground, a brook or a ditch, as tho in an endeavor to quench the burning away of their organs. Many come back to their homes laden with pollen and poisoned honey, but drop fagged out, instinctively remaining outside to die.

Those that receive poison close by may deposit their load in the combs before becoming affected, unwittingly spreading agony to the nurses and the brood. Few of the poisoned bees die within the hive to be carried out. Such is the remarkable instinct among bees, where the family comes before the individual, that when the bees reach the stage of poisoning characterized by a diarrhoea they crawl forth even thru the night to void the poison outside of their home.

The next morning after the spraying was done the field workers sally briskly forth, but because the poison in their system has paralyzed the wings their attempt at flight results in failure. Down they drop from the alighting-board—usually never to arise again. At first excited and nervous they scurry about, climbing up weeds and grass, clustering on the outside of the hive, which because of the diarrhoea afflicting them they spot profusely. With wings quivering they jump along, trying to fly a few inches at a time, gradually getting further and further away from the hive. In a few minutes a stupor overcomes them; they have less and less control over their movements; they are barely able to crawl; they fall over on their sides; some spin on their backs; they clutch convulsively with their legs; their tongues become extended full length. As the paralysis becomes complete they quiet down, accumulating in depressions of the ground 20 or 30 feet from the apiary by handfuls or even by literal quarts. Their mission in life is over, altho unfulfilled.

As the sun warms up, some of these afflicted in less degree revive sufficiently to fly or crawl away from the vicinity of the hives. Such bees probably never completely recover. It is doubtful if they ever return, for we have noticed that other insects once stricken with arsenic become unable to digest food, and tho they may linger on for days and even weeks finally die of starvation, if not of poisoning.

The poisoned honey brought into the hives kills the nurses and young bees. Drones and

queens are also affected; one observer reporting, however, that in some colonies everything was killed but the queens, so that he had a dozen lone queens surviving. The brood in all stages is destroyed. Sometimes only unhatched eggs remain after the plague has swept thru, the helpless new brood appearing but to perish unattended. In case of incomplete destruction of the colony, poisoned honey is stored away to be drawn on later, when symptoms of arsenic poisoning reappear. Such after-effects are common when bees are removed from the orchard region. Thus it is also that bees may show symptoms of poisoning early in the spring before the spray season opens.

Financial Loss to Beekeepers from Spray Poisoning of Bees.

Questionnaires sent the past two seasons to beekeepers in the fruit-growing districts of Washington reveal the widespread and serious nature of spray poisoning. By tens of thousands colonies of bees are being so depleted as to become non-productive, and by thousands colonies of bees are being completely wiped out. The money loss for a season has been computed to be more than \$50,000.

Aside from financial considerations there enters the question of fair play and moral and legal rights. Why should one group of people be permitted to put poison in the path of so industrious a benefactor of humanity as the honeybee? When it is further realized that bees are all-important to fruit-growing the question becomes even more pertinent, for it becomes suicidal to best orchard interests to drive away the honeybee and to destroy year after year the native insect pollinizers.

To avoid actual extermination beekeepers are forsaking the orchard districts. It is their silent protest but best retaliation to their neighbors who manifest so little regard for the rights of others. Bees are gradually becoming a rarity in those districts where they are most needed.

Correction of the Trouble Involves No Actual Hardships.

If bees are to be won back and propagated in the fruit-producing districts the following conditions must be met.

a. The calyx spray must not be begun until fully 80 per cent of the blossoms have dropped. This is consistent with best spraying practice. At that time the nectar flow has ceased.

b. Cover spraying should not be overdone. A tree will drink up a definite amount of spray without dripping and nothing is to be gained by spraying beyond that point. A careful operator can spray an orchard with utmost efficiency and yet have scarcely a drop fall on the cover crop.

c. Cover crops should not be permitted to bloom at the time of spraying. Practically this is usually accomplished by cutting before driving thru with the spray outfits. This avoids the poisoning of nectar and re-

moves the inducement to the bees to visit the orchard while spraying is in progress.

d. Aphids must be kept in check on such varieties of fruit as receive summer applications of arsenicals. This would avoid the production of honeydew to become contaminated.

It is the overzealous fruit-grower who, whitening his apples and his alfalfa, should be made to understand that it is his desire to best the codling moth that is giving Washington apples the reputation of being poisonous to eat, that is responsible for the impression that orchard-grown hay is deadly to horses and cattle, and that is driving away the best supporter of his industry—the beekeeper.

It may prove that some suitable material will be discovered that can be added to the spray as a repellent to bees, thus enabling the fruit-grower who wishes to keep bees to grow his alfalfa and do his spraying without further regard for his little friends. Lime-sulphur, nicotine, lime, and creosote have each been suggested for this purpose, but information is too meager to give out a general recommendation as yet. In some preliminary experiments we have conducted we have found that bees react in unexpected ways to substances nauseating to ourselves. Lime-sulphur, carbon disulphide, and naphthalene were preceptibly avoided by bees; while ill-smelling butyric and pyroligneous acids were unnoticed. It may be that calcium arsenate will be less destructive than the lead arsenate; it may be that dry dusting will be better than liquid spraying.

Corrective Legislation Will Afford the Quickest Benefits to All.

While it is inconceivable that any fruit-grower conversant with the facts would willfully place poison in the path of his neighbor's honeybees, yet we all appreciate how slow is the directing of reforms thru appeals for sympathy. In the meantime the beekeeper must live by the lives of his bees. His part is not to beg for humane consideration of his troubles; he cannot wait on educational propaganda; he cannot take chances on losing his all; and so he moves away until fruit-men come to realize that they need the bees more than the beemen need the orchard flowers.

Many States in the interest of beekeeping have enacted laws prohibiting the spraying of trees in blossom. This alone would not meet the situation in the Northwest, because the custom here of growing a cover crop is responsible for most of the trouble.

For the ultimate good of fruit-growing, as well as of beekeeping, Washington should enact a law to forbid the placing of poison inadvertently or deliberately, where bees or other insect pollinizers will unavoidably secure it. Such a law would apply only to the careless orchardist, who would either have to cut his alfalfa before spraying or else hereafter use care in spraying not to overdo the application.

FIREWOOD, or great willow-herb (*Epilobium angustifolium*), belongs to the evening primrose family. It is a tall plant two to seven feet high, bearing long spikes of large rose-pink flowers, which have only four petals. The plant is a native of the northern parts of Europe, Asia, and America. It has a more northern range than any of the other principal honey plants, and is common in many parts of Canada. Across the continent it is more widespread and less subject to failure in flowering two or three hundred miles north of the international boundary than to the south. In Canada, it is most abundant in British Columbia, both in the mountains and on the coast. It is common in central and northern Alberta, northern Saskatchewan, in Manitoba, particularly around Lake Winnipeg and in the low moist lands of eastern Manitoba, in northern Ontario, particularly in the Rainy River district and in the clay regions, also around Lake Temiskaming, and in burnt-over areas in Quebec and the maritime provinces. In Canada, fireweed reaches its greatest development, both in height of the plant and in the number of flowers to the head, in the Lower Fraser Valley of British Columbia. It is most dwarfed and the flowers are fewest at the highest altitudes.

Springs up After Forest Fires.

The chief feature about fireweed is that it is apt to spring up in great abundance on newly burnt forest and bush lands. In the more southern part of its range it dies away after a few years, being crowded out by other plants. In some places, for instance at the lower end of the Gatineau Valley in Quebec, wild raspberry, also a good honey plant, is one of the first plants to replace it. Among other honey plants that may follow it are Canada thistle, goldenrods, asters, and willows. Near Maniwaki in the Gatineau Valley, about 100 miles north of Ottawa, a fireweed location was practically exhausted about six years after the fire that produced it; but over 100 miles further north, near the height of land about halfway between the city of Quebec and Lake St. John, in a place where the local inhabitants said a fire had occurred 15 years before, a fair amount was still flowering. Flowering plants are scattered, but not very thickly, in clearings all along the Canadian National Railway that traverses northern Quebec and northern Ontario, east and west of Cochrane, especially in low wet places.

At Hector, B. C., 5200 feet altitude, and Glacier, B. C., 4000 feet, the highest points in the Rocky Mountains and Selkirk Range on the Canadian Pacific Railway, numerous large patches of abundant fireweed in flower

FIREWEED, OR WILLOW-HERB

A Great Honey Plant of the Far North, Extending Into This Country in a Few Places Only

By F. W. L. Sladen, Dominion Apiarist

remain year after year and show no signs of diminishing, but how far it would be profitable to keep bees in these locations has not been determined. Be-

tween Lacombe and Edmonton in Central Alberta, fireweed will appear and flower well in wheat fields in patches where the grain has failed to grow, and it is fairly common in the scrub lands.

Heavy Yields of Nectar When Conditions Are Favorable.

In a good year in a good fireweed locality, large yields of honey have been obtained. W. H. Turnbull, who keeps a small apiary on the Pacific Coast at Sullivan Station, near New Westminster, B. C., writes:

"Last year my two best colonies gave me 550 pounds each. I am satisfied that this was mostly, if not all, from fireweed, which grows around here in great profusion. I have my



Fireweed on a mountain side in British Columbia.

apiary on the edge of a swamp, and my bees get nectar from the fireweed growing there when the bees on the higher ground are loafing and robbing. This season, owing to dry, hot, and smoky weather, the fireweed crop was short."

A colony on scales in a large apiary at Montcerf, Quebec, about 100 miles north of Ottawa, gained over 20 pounds a day from fireweed for several days around August 12, and the average annual yield for six years was 144 pounds to the colony, of which, probably about 100 pounds was from fireweed.

The nectar is on the surface of the flower, wholly and easily within reach of the honeybee. Under the most favorable conditions for nectar secretion, the nectar in each of the four nectaries is produced in such a large quantity that the four drops coalesce, form-

ing a large drop that can be shaken from the plant.

An examination of fireweed flowers in many places in northern Ontario by the writer in July and August, 1918, showed that they secreted nectar more readily and under a greater variety of soil and weather conditions than alsike and white clover. The honey flow also lasts longer than that of clover. In the Gatineau Valley it begins one or two weeks later than clover, about July 10, and goes on until about Sept. 5. It thus covers the whole of the best part of the summer after the bees have had plenty of time to build up. Each main stem carries numerous flower buds; those at the bottom open first, and the flowers slowly ascend so that several weeks elapse before the top buds open. Flowering side shoots also develop.

In the warmer valleys of the southern part of British Columbia the plants start to grow so early and develop so quickly that many come to an end of flowering a good while before the end of the summer; but in the north, they continue flowering until there comes about five degrees of frost, which is severe enough to destroy the bloom. In northern Ontario, this killing frost often comes as early as the last week of August.

Fireweed likes moist ground and a cool temperature. As in the case of other plants, cool nights and warm days cause the greatest nectar secretion. Mr. Turnbull's statement that his fireweed yields best on the edge of a swamp is in line with a remark made to the writer by F. Dundas Todd, that it "needs to have its feet wet," and with observations made at Monteith, Ont., where in burned-over clay ground that was so moist

that it was covered with green moss and liverwort, a very copious secretion of nectar had taken place on a sunny morning, Aug. 7, 1918.

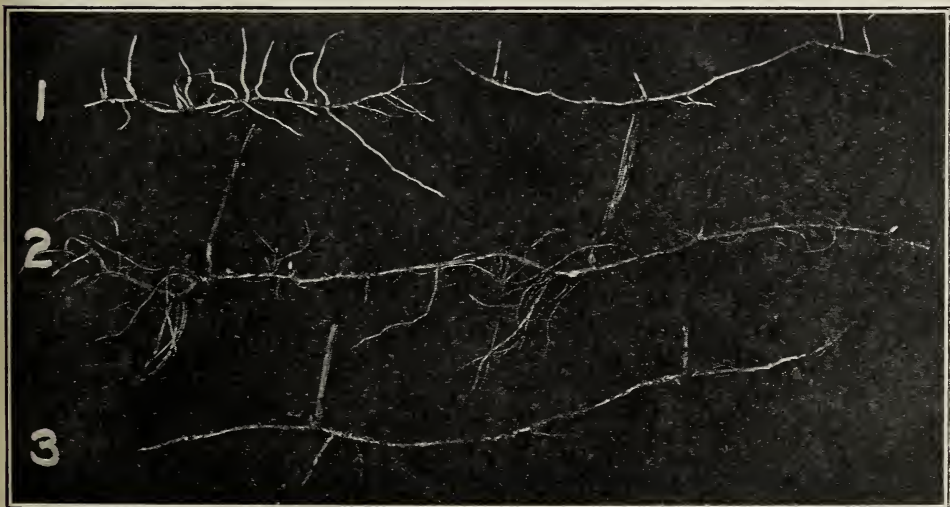
Drainage is probably important, as I have frequently noticed poor growth and poor secretion in undrained swamps.

Unfortunately, the best areas for fireweed-honey production are often hard to reach and are seldom utilized by beekeepers. The loss of the apiary by a fresh forest fire must be guarded against in some places.

Different Methods of Propagation in Different Regions.

In eastern Canada repeated dry, warm seasons weaken the plants and cause them to die out. In the frequently dry and warm region near the junction of the Ottawa and Gatineau Rivers at Chelsea, Quebec, it was noticed that, after a fire the fireweed developed, not from the seed which was blown all over the country in the fall, but from the rootstocks of scattered plants that had been existing in the bush in a languishing state without flowering. Directly after the fire, these rootstocks threw up strong plants and developed rapid root growth, which traveled over 20 feet in different directions and produced buds at short intervals. The following year each bud produced a flowering plant and a further extensive network of rootstocks. Numerous seedlings were watched; it was noticed that all died except those that were kept continuously moist on the borders of streams in wet places.

On the other hand, at Monteith, Ontario, in a cooler moister country about 200 miles further north, a splendid stand of fireweed was found in a moist clay bush land that



Hibernating rootstocks of fireweed from near Ottawa, Ont., in October. 1. In newly burnt ground. 2. An older root. 3. An isolated old root from the bush, no longer flowering. The buds are smaller and less plentiful as the root grows older.

had been burnt over the previous year, the dead trees still standing and affording considerable shade and protection from wind. Scattered thru this stand were solitary stalks of a white-flowered variety of fireweed, showing clearly that this stand had developed from local seed and not from the creeping rootstocks. Much of the land, covering many miles along the railway north and south of Montieth, that had been burnt over at the same time, showed little or no fireweed. Some of this land was dry or sandy, and in parts of it there had sprung up instead of the fireweed the annual fleabane, or horseweed (*Erigeron canadensis*), which is the fireweed's principal rival for the occupation of newly burnt-over land. This plant unfortunately gives no honey. While fireweed prefers clay and particularly soils rich in humus and even the rotting remains of fallen trees, it will grow in the north and spread for a while in soils that are rather sandy, and often grows particularly well on rocky ground that has been burnt over.

Travelers to the Yukon and other parts of the far north of Canada have often remarked the fireweed which is prevalent as far as the forest extends, even to the delta of the Mackenzie River.

Another Species in Far North.

In the arctic and in the glacial streams high up in the mountains of British Columbia there abounds another species of fireweed, *Epilobium latifolium*. This species grows to a height of less than one foot and has broader leaves and larger flowers than *E. angustifolium*, and it blossoms profusely. It is common on the low, often temporarily submerged, sandy and gravelly islands and the shores of the arctic rivers.

The writer has seen a good deal of fire-

weed that would have made a good stand, but for the fact that its blossoms were few and puny or failed to develop from the flower buds, and the plants had a weak and sickly appearance. In some cases the leaves were riddled with holes. These plants were in the Rainy River district, both on the Ontario and Minnesota sides and in the Gatineau Valley and near Lake Temiskaming. They were mostly in stands that were known to be old and fast deteriorating, and it was noticed that the roots were brown and rotting at the heart. The plants in the more northern and mountain regions were always vigorous and had large flowers.

So far, our knowledge of the commercial possibilities of fireweed as a honey plant is practically confined to the southern part of its range where it lasts only a few years after a fire. For the higher and more northern places where it lasts permanently, we have hardly any information, but rather high yields reported annually by a beekeeper near Melfort in northern Saskatchewan are probably mainly from this plant, which the writer has seen in abundance there.

Fireweed honey is almost water-white and has good density and a very mild flavor. It granulates after extraction.

The seed of the fireweed is very small and has long down attached to it. It is borne in long narrow reddish pods which burst and liberate the downy seeds in great quantity. These are blown thru the forests in the fall, sometimes in such quantity as to make the eyes of the moose-hunters sore.

Possibly on account of the absence of a strong scent, it sometimes takes the bees a few days to discover the fireweed when they have been working on other plants.

Ottawa, Canada.



THE statement has often been made that successful comb-honey production requires that the colonies be rousing strong at the beginning of the honey flow. Quite true, but the same thing is also true for best results in extracted-honey production. While it is possible to secure some surplus honey from weak colonies by supplying them with extracting combs instead of with comb-honey supers, it certainly is no less desirable to have powerful colonies at the beginning of the honey flow when producing extracted honey than when producing comb honey. The difference, if any, between the condition desired by the beekeeper when colonies are to produce comb honey is in the com-

COMB HONEY PRODUCTION

Importance of Heavy Brood-Rearing at Just the Right Time

By Geo. S. Demuth

most beekeepers prefer to have the brood in compact form. The problem of the comb-honey producer previous to the honey flow is therefore not materially different from that of the producer of extracted honey.

In most of the territory where comb honey is produced commercially in this country the main honey flow begins some time in June and is often so short that the eggs that are laid after the honey flow begins, result in bees which mature too late to take part in gathering and storing the crop of honey. Wherever, therefore, the honey flow

pactness of the brood, which is so desirable for comb-honey production. The brood may be more scattered when producing extracted honey, tho even then

begins in June, most of the workers that gather the crop must be reared during April and May, and in order that they may be young and vigorous for their work the vast majority should be reared during May.

The "Harvest Hands" of the Hive.

These workers are the "harvest hands" of the hive; and, if the flowers and weather do their part, the crop of honey will usually be much or little according to whether the workers to gather it are many or few. A great horde of workers coming on the stage of action at just the right time is the goal toward which the beekeeper has been working since last summer. So far as he is concerned, this great army of workers is that for which all the workers born at other times have existed. The bees reared previously have been useful only in as much as they have contributed to the final production of these "harvest hands," and bees reared later are useful only in as much as they are able to contribute to the maintenance of the colonies until next season unless there is a later honey flow which they may help to gather.

Most Important Period of Brood-Rearing.

This period of brood-rearing, therefore, has a significance not found at any other season. Whether the main honey flow comes in March and April as among the orange groves of California and in the tupelo and orange regions of Florida, in June and July as in the clover region of the North, or during August as in the buckwheat region of New York and Pennsylvania, the size of the crop of honey that can be harvested depends largely upon the amount of brood reared during the six or eight weeks just preceding the beginning of the honey flow.

Tendency to Rear Brood Strongest in Spring.

When the bees begin brood-rearing in earnest in the spring the tendency to rear a large amount of brood is the strongest. This is especially true in the North where the spring brood-rearing reaches its maximum during the latter part of May or early in June. If conditions are favorable for heavy brood-rearing at this time, the amount of brood in the hive is increased rapidly until the peak is reached, after which it is reduced so that there is usually less brood in the hive thruout the remainder of the season. If anything, such as weakness or insufficient food, prevents the colony from reaching its peak in brood-rearing in the spring, it may climb to its peak later in the season when normally the tendency to rear brood would be less intense; but, after the first spurt of extensive brood-rearing of the season, it is difficult to induce colonies again to rear anything like as much brood during the same season.

Time of the Main Honey Flow in Relation to Spring Brood-Rearing.

In some locations, such as in some of the southern States and in a strictly buckwheat

region, the main honey flow may come as much as two months after the bees have passed the peak of spring brood-rearing, assuming that the colonies were normal in strength and had sufficient food to have reached their maximum in brood-rearing in the spring. In such cases some beekeepers resort to such measures as stimulative feeding or spreading the brood, to induce more brood-rearing just previous to the main honey flow. Others move their bees to another location to gather a crop of honey from some earlier source while the colonies are strong, and then move them back again for the later honey flow. Some southern beekeepers sell package bees to utilize the excess of workers which would be too old to be of use when the honey flow comes on later; while still others divide the colonies before they reach their peak in spring brood-rearing, performing the division at a time which will permit both colonies to build up to greatest strength in time for the belated honey flow. The last-named plan has been used quite successfully in the buckwheat region.

When the main honey flow comes at the same time that the bees are rearing the great horde of "harvest hands" in the spring, as too often happens in the case of weaker colonies and an early honey flow, of course a full crop of honey can not be secured, for the field force is then small and the amount of brood to feed is large. The only hope in such cases is that the honey flow will last long enough for colonies to become strong enough to gather some surplus before it closes, but the remedy is better wintering and earlier building up.

When there is a possibility of a honey flow still earlier, at the beginning of the heavy brood-rearing period of spring, as sometimes happens in the North when the maples yield profusely, or in the citrus region when the bloom comes unusually early and the bees are late in building up, brood-rearing is greatly stimulated and but little honey is stored because of a lack of "harvest hands."

Fortunate, indeed, is the beekeeper whose location furnishes the main honey flow of the season immediately following the period of natural spring brood-rearing, for he produces his workers for the honey flow at the time the bees are most willing to co-operate. This is the condition present in most localities where comb honey is produced on a commercial scale.

In the northern States where the heavy brood-rearing period comes in April and May, normal colonies reach their peak in brood-rearing the latter part of May or early in June. In this region colonies that are normal as to number and vitality of the workers and have a good queen early in April can be depended upon to build up to rousing strength within two months to be ready for the honey flow early in June, provided there is nothing to hinder them from

following their natural instincts as to brood-rearing at this time. Too often, however, something happens to prevent the bees from developing their greatest strength at this time. If egg-laying should be stopped entirely for a single day when the queen is laying at full capacity, the number of workers that will be ready for the honey flow is reduced by just that much. In some cases the eggs laid by the queen in a single day will result in a half pound of young bees three weeks later. It is, therefore, extremely important that nothing shall be permitted to interfere with brood-rearing at this critical time.

During the first half of the building-up period it is better if the bees do not crowd brood-rearing too much. The cool weather and stormy days of April may be a decided advantage in this respect, for when the main honey flow comes in June it is better for the heaviest brood-rearing to be done in May. Remembering that the bees are more than willing to do their utmost in brood-rearing in the spring, especially in the North, the beekeeper needs only to see that the bees are not hindered in carrying out their own program in their own way. Stimulative feeding and spreading brood should not be practiced during April in the North. These, if done at all, should be done some time in May when brood-rearing should be heaviest.

Spring Protection.

Colonies that have been wintered outside should be left packed until the middle of May or later, if this can be done without too much trouble. Colonies that were wintered in the cellar should be well protected from wind and the covers should be left sealed down during early spring unless it becomes necessary to open the hive. Colonies may be examined without removing the cover, by looking in from below. In some locations beekeepers find that it pays to pack the bees after they are taken out of the cellar, though in most cases this is not done.

Room for Brood-Rearing.

In order that the bees may rear the great army of workers for the honey flow there must be sufficient room in the combs for the greatest amount that the colony can produce, which in the North may be 60,000 to 70,000 cells in the best colonies. While this number might all be crowded into 10 or 11 standard combs, it is usually spread over more.

For this reason the combs should be as nearly perfect as possible, for imperfect comb in the brood frames not only reduce their capacity for brood-rearing, but they also stand in the way of the rapid expansion of the brood nest in the spring. If a comb which is not suitable for brood-rearing is between the comb on which the queen is working and the other combs beyond, this imperfect comb stands as a barrier to progress in brood-rearing. Drone comb in the lower

corners of the brood frames and comb that is too badly stretched to be used for worker brood in its upper portion greatly reduce the capacity for worker brood, and when two stories of such combs are used to supply sufficient room for brood-rearing, this imperfect comb near the top-bar stands as a barrier to the free expansion of the brood nest thru the two stories.

Stores for Spring Brood-Rearing.

Most colonies that are normal in April but which fail to develop their full strength before the honey flow in June, fail because of a lack of stores. One of the hardest things for beekeepers to learn is the surprisingly large amount of stores needed for the colony to rear the large force of workers required to gather the crop of honey. During the latter half of the building-up period the amount of brood is increased with astonishing rapidity, provided the bees have sufficient food to convert into young bees. When there is no opportunity to gather nectar from the fields at this time on account of cold or wet weather the stores of honey within the hives disappear rapidly; but, if the reserve supply runs low, brood-rearing is reduced to a degree that is ruinous at the very time that the "harvest hands" are being reared.

In the clover region there is an old saying among beekeepers something like this: "If the bees do well on the early flowers and fruit bloom, there will be a good crop of honey in June." This old saying implies some mystic relation between the two, by which it is possible to predict what the honey crop will be by noting how well the early flowers yield. This relation is no longer a mysterious one; for the up-to-date beekeeper, by supplying the deficiency in stores when the early flowers fail, is still able to produce a crop of honey as he thus furnishes the food which is necessary to produce the workers that gather the crop.

An Automatic Feeder.

During the month of May in many of the northern States, and during April or earlier farther south, most of the brood which is destined to make the "harvest hands" is being reared. Whether the food used in rearing them is being brought in from the fields or is being supplied by the beekeeper thru feeders or is stored in the hive, the amount must be sufficient if the colony is to attain full strength in time. One of the easiest ways to insure this is to give each colony a second story of combs which are about two-thirds filled with honey. This second story becomes an automatic feeder, feeding the bees only as food is needed; and, in many localities at least, such a feeder, in addition to being automatic in its action after being filled the first time, is usually refilled each season without cost because of the better condition of the colonies thus abundantly supplied with stores.



REPELLENT IN SPRAY

How to Prevent the Poisoning of Bees by Arsenate of Lead Spray

On June 20, 1920, an apple orchard adjoining my apiary was sprayed in an attempt to prevent further damage by the gypsy moth caterpillars, which had come swarming out of the near-by wood and were not only attacking the foliage but also the young apples. The next day I found quantities of dead and dying bees about my hives. The bees were crawling on and thru the grass, making futile attempts to lift themselves on their wings. Many of the alighting-boards were spotted as with dysentery, and the bees' bodies when pressed by accident seemed to contain the same unpleasant-smelling matter. At first I thought of paralysis or Isle of Wight disease, but soon connected the spraying with the death of the bees and feel not the slightest doubt that it is a plain case of poisoning. It is a question where the bees got the poison—whether from the sprayed foliage (of course the blossoms had long since gone by), from a poisoned drinking place, or from a scanty growth of alsike clover under the trees. I was unable to determine the source from personal observation, but it must have been from one of these three.

Beekeepers in certain sections of New England have sustained severe losses from poisoning. I wrote to the Bureau of Entomology, Washington, and the experiment station of the Massachusetts Agricultural College to see if they knew of any repellent which would make arsenical sprays unattractive to bees, but they could give me no help on the subject and knew of no such repellent. So, when I heard of a repellent which has been and is at present being used with great satisfaction thruout the city of Newton, Mass., it seemed to me that its use should be more generally known.

A few years ago the city forester of Newton, at the request of a prominent beekeeper, F. S. Gourley of Waban (a part of Newton), agreed to use milkol as a repellent. Mr. Gourley had lost all his bees by poisoning at spraying time the year before, and had, after consultation with chemical and other scientific friends, finally hit on milkol as a cheap and good repellent. It has been used ever since with very good results. Practically the entire city is sprayed every year and bees are kept successfully.

Milkol is an ordinary disinfectant, somewhat similar to sulpho naphthol or carbonol. One pint of milkol is used to 100 gallons of the regular arsenate of lead spray. Foresters are, as a rule, afraid to use anything of this kind, fearing it will lessen the adhesiveness

of their spray. The city forester of Newton has stated that, in his opinion, milkol not only does not lessen the adhesiveness but has quite the reverse effect—it increases the adhesiveness of the spray and is therefore quite a desirable addition.

Josephine Morse.

South Lancaster, Mass.

ESSENTIALS OF PRODUCTION

The Importance of Having Colonies Strong at Just the Right Time

When you failed to secure a crop of honey did you stop to consider why, or did you just charge it up to "bad luck," as so many are prone to do? Do you realize that two chances to one, your failure was due to your own fault, and not to that of the bees, or even the fault of that much abused personage called "bad luck"? It might pay us to analyze the situation, and see what things we did, or did not do, to contribute to that failure.

There are a few things that are necessary to success in honey production, things which may be termed essentials, and, contrary to the general opinion, these may be reduced to a very small number—in actual practice, to only three factors: First, a location where there is available an abundant source of nectar; second, a hive which has plenty of room, both for storage and brood-rearing; and third, a good, strong colony of bees.

The first of these essentials, that of location, or nectar supply, is partly beyond the control of the beekeeper, as it may be affected by the weather, or by the destruction of the nectar-bearing flora. However, it is often possible to improve a location very materially by growing such honey plants as the clovers, etc. On the other hand, the bees may be moved, in many instances, to another location where there is a dependable source of nectar.

The size of the hive will depend somewhat on locality; but, during the honey flow should be of sufficient capacity to contain all of the nectar brought in, as well as room for brood and bees, for if the colony ever becomes crowded for lack of room, the honey crop will suffer more or less. During a heavy honey flow the green nectar will require much more room than is necessary for the ripened honey, and so supers should be added to take care of this.

Now as to the third essential. What we refer to as a strong colony should contain at the beginning of the main honey flow, from 10 to 20 pounds of bees; or, in other words, from 50,000 to 100,000 worker bees,

besides a prolific queen, and brood in all stages.

How shall we secure such colonies? Again we have three essential factors, namely: A colony that has wintered well; plenty of food for the rearing of brood (either honey, syrup, or nectar, and pollen); and, in the third place, a brood-chamber large enough to accommodate a prolific queen. I am convinced that most of the hives in use have a brood-chamber that is entirely too small, resulting in the checking of brood-rearing, crowding of the brood-nest, and consequent swarming. Even the ten-frame Langstroth hive-body in common use is too small for a good queen; and we can get a much greater amount of brood reared by



Corner of apiary of J. M. Buchanan. Strong colonies are the ones that store the honey.

the use of a larger brood-chamber, either one with larger frames, or more of them in the hive, or else by allowing the queen the use of two stories of combs during the period of greatest brood-rearing in the spring.

It is important that the colony should have wintered well and come up to the period of spring brood-rearing with bees that have not wasted their vitality to a large extent in the attempt to keep up the temperature of the cluster during the rigors of winter. In order that a colony should winter properly and come thru in the best condition for building up, we find that once again, there are three essentials, which are sufficient stores, adequate protection, and plenty of young bees at the beginning of winter. There should be at least 25 pounds of honey per colony, and more would be better, for if it is not needed it will not be wasted.

As to what constitutes adequate protection, that is a matter of locality and climate, and must be worked out to suit individual cases. If the bees are wintered out-of-doors, we can hardly emphasize too strongly the value of some kind of wind-break, wherever freezing temperature occurs at any time during the winter months.

For good wintering, it has been demonstrated that there should be as many as three pounds of young bees in each colony when brood-rearing ceases in the fall, and where there is a late honey flow the bees will generally attend to that themselves. But if there is no honey coming in during the autumn months, the beekeeper should resort to stimulative feeding to secure late brood-rearing. A few ounces of thin syrup given every day or two for a month will give good results.

It is not my purpose at this time to go further into the details of methods of manipulation, styles of hives, equipment, etc., as these are all relative matters, which will necessarily vary with different persons, localities, and nectar sources; and the individual beekeeper must adapt them to his own conditions to the best of his ability, always keeping in mind the fact that, if the essentials are present, success will be attained.

J. M. Buchanan.

Franklin, Tenn.



FINDING QUEENS

An Easy Way to Find the Excitable Kind

After having had considerable trouble in finding the queens, especially "blacks" and having sometimes opened a hive three different times and spent an hour in the search without finding the queen, it occurred to me that an excluder could be used to advantage. I proceeded as follows: If a super is on the hive, this is removed and set on an empty hive-body, the excluder is placed on top of the super, and another empty hive-body placed on top of this. Then the brood-frames are taken out of the hive and the bees shaken into the empty hive-body above the excluder when they generally pass down thru the excluder into the super at once. If they are slow in starting, a little smoke will send them down. Unless I happen to see the queen before, I do not look for her until all the frames have been shaken and the workers are about all thru the excluder, when she will generally be seen at once among the drones. If she is not found then, the few bees on the bottom-board and on the sides of the brood-chamber are shaken and she will be found as soon as these have passed thru the excluder. If there is no super on the hive, the bees on two frames of brood are shaken into the brood-chamber, these frames of brood placed in an empty hive-body, the excluder on top of this body and the other empty hive-body over the excluder, then the bees are shaken into the upper hive-body as when the super is used.

Pomfret, Vt.

Carl C. Johnson.

THE weather has been mild in New England, as thru most of the United States, during the past three months, with little snow, yet with the ground covered with snow enough to protect clover most of the time.



Mr. Bedell writes me that after the cappings from 1,000 pounds of extracted honey have stood and drained for 24 hours he can press out from 30 to 40 pounds honey "in the very best marketable condition," leaving a cheese 15 inches in diameter and $4\frac{1}{2}$ inches thick.

On page 146, H. F. Wilson lays down a good, solid foundation for building up strong colonies for the honey harvest. First, by protection from the wind. Second, by packing the brood-chambers to keep them warm. Third, by giving them lots of honey and then more honey. Good advice.

Allen Latham's hypothesis of the cause of the 'washboard action of bees' is certainly ingenious. (See page 152.) With his theory to start with and thousands of watchful beekeepers studying the same subject, we may in time be able to prove this theory correct. How much there is about bees yet that we don't positively know!

Page 160, ah, ha! Mr. Parks, your bees down in Texas working all thru January on fruit bloom! Why, we here in New England keep such dainty bee forage until May or June. It seems positively wicked to keep your bees at work the year round. We give them a rest from September till April, but we find it pretty hard keeping the little fellows quiet. Yesterday (March 1) we found some hives with as much as a whole Langstroth frame full of brood.

L. L. Andrews, on page 159, offers some sensible advice in view of low prices. He says: "There is no cause for any great anxiety in the matter. Prepare for a crop and produce it just as economically as you can consistently with the general conditions. The writer has sold honey in times past at a figure really below the cost of production, if an honest labor and expense charge were made. But with present methods of marketing, it is not likely we shall be called upon to do it again."

In the January issue of Gleanings Mr. Holtermann writes of his success with a wax press for separating honey from capping

when extracting. In the February issue I suggested that it would be very interesting to know just what per cent of honey remained in the pressed cappings. Now

comes Fred P. Jansen, on page 169, and states that he has used a press of his own construction and has found the average amount of honey remaining to be 50 per cent of the pressed cappings, sometimes a little more, and sometimes a little less.

I have often wondered how bees managed to rear their brood while their wax organs were being developed, if the theory of some naturalists is true that bees that build their combs of woody fiber and those that build their combs with wax come from the same ancestral source. A statement by W. B. Schrele, on page 147, would seem to throw considerable light on this subject. In speaking of the native bees of Costa Rica he says: "Some build wax combs; others, half wax and part woody fiber; still others build all fiber nests, something like a wasp's or hornet's nest."

Early in February I received from O. W. Bedell a small sample of pressed cappings. He wrote me the sample was hardly a fair one, as it was two or three years old, but all he had. He desired me to test it and find out the per cent of honey it contained. It appeared quite dry and gave little evidence of honey; but, on melting it in water, I found 41 per cent to be honey and 58 per cent wax and sediment. So I think we may safely conclude that from 40 to 50 per cent of these pressed wax cakes or cheeses is honey. This does not condemn the wax press by any means, but only shows that it will pay to melt the wax cakes when we have the leisure and save what honey remains.

Formerly the great burden of our bee journals was how to produce more and more honey; but of late the thought of selling is looming up as a big part of the business, with the idea of selling near home and by advertising. Mr. Aeppler, on page 153, March Gleanings, tells how he disposed of his 10,000 pounds to good advantage in a retail way by advertising; and C. A. Burch of Indiana, page 162, tells how he disposed of his crop in the same way. There is no question but that large quantities of honey could be sold if people only knew where to get it. We have recently had orders for honey from the middle West and even the southern States, to be sent by mail. I feel sure people would not send so far for honey if they knew it could be obtained near them.

DID you ever know a woman to accept an invitation to share in a four weeks' trip, with just one hour and 40 minutes in which to prepare for

it? Take my advice and don't risk such an invitation unless you mean it, for my nearest man-relative tried it, and now he is paying for my traveling and hotel expenses. In other words, much to my own surprise, this page is being written beside an open window, thru which the soft California air is pouring, instead of in a steam-heated room back in Ohio. Altho there were dozens of reasons why I should stay at home, I temporarily forgot everything except that the husband I have had for 23 years was going to the beautiful State which I adopted a year ago, and I wanted to be with the former in the latter.

Some of my friends laugh at my enthusiasm for the Golden State, and returning tourists have even professed not to like its climate or scenery. Everyone to his taste, but it is my candid opinion that a person who can find fault with California at this time of year will point out defects in Heaven if he ever gets thru the pearly gates.

At the start I had rather regretted that we were not going by one of the southern routes, but for delightful contrast nothing could excel the route we took to San Francisco. We had ridden for days thru country which showed no signs of spring, the last day thru treeless desert plains, rimmed by great, barren mountains, some of them covered with snow, their only beauty lent them by the brilliantly clear air and the dazzling blue sky, the reflection of which in the desert parts made the country "The land of the sky-blue water."

At night we climbed the mountain range out of Nevada into California, went thru the 21 miles of snowsheds with moonlight glimpses of great, snowy peaks thru the breaks in the sheds, and when morning came we were dropping down the west slope of the range into springtime in Paradise.

In contrast with the dull gray brown sage of the winter desert the grass was everywhere a velvety green, and after seeing scarcely a tree for days the magnificent trees dotting the landscape were a beautiful surprise. And oh, the wonderful orchards of fruit bloom, mostly apricot, I believe, altho they looked much like peach trees to me. Even high up on the green foothills were orchards covered with those soft pink blossoms.

Gardens and fields under cultivation, sheep and cattle on the green hills, picturesque mountains in the background, fertile valleys, woody canyons, bird music, palms, orange trees and flowers, flowers every-

AMONG CALIFORNIA BEEKEEPERS

CONSTANCE ROOT BOYDEN
(Stancy Puerden)

where, combine with the perfect climate to make one understand how Adam and Eve must have felt when driven out of a similar Paradise.

WHAT started my traveling companion to California at this particular time was the thirty-second annual meeting of the California State Beekeepers' Association, held in Oakland March 2, 3, 4, and 5. Its sessions are being held in the fine large municipal auditorium across the boulevard from beautiful Lake Merritt.

Westerners certainly know how to do things of this sort. In the first place they persuaded the governor of the State to issue a proclamation that this was honey week for the whole State, and calling upon all the citizens to eat honey this week. In every street-car in the city is a large placard, "Eat Honey."

The city provided an ideal place for the meeting with ample free space for exhibits, the mayor gave an address of welcome, and plenty of able speakers seem available. I imagine a very large part of the credit is due to the enthusiasm and energy of Cary W. Hartman, president of the Alameda Beekeepers' Association. He makes an ideal host.

Just as we were leaving the Hotel Oakland to attend one of the sessions an incident occurred which is so typical of the West that I am going to take space to tell it. In the doorway we met a party of four or five fine-appearing men. One of them stepped up to Mr. Boyden, shook hands cordially, and said, "How do you do, sir. I am nobody in particular, but I just wanted to shake hands and bid you welcome to our city." He had noticed the yellow ribbon badge of the State Beekeepers' Association, which Mr. Boyden wore.

Now I have no intention of attempting to give a report of this beekeepers' meeting, but I am going to tell you a little about an address by C. H. McCharles, chemist for the State Food and Drug Laboratory of the University of California. He was to talk on "Composition of Honey, detection of adulteration and effect on honey of overheating and other bad things in the care of the product. Also difference in composition as influencing granulation"—some subject.

Prof. McCharles, with the aid of charts, told us something of the chemical composition of the various sugars, including those in honey. I think he stated that his figures were based on government bulletin reports, but he put the water content of honey rather higher than generally stated.

In the course of his remarks it developed

that he believed the food value of honey to be no greater than any other sweet of the same calory value, that the ash content had absolutely no value, that honey was no easier to digest than any other sweet, that honey should be considered a delicacy rather than an important food, that he could see no reason why corn syrup should not be mixed with honey if it were so labeled, that it might even be an advantage in preventing granulation, that he did not know whether or not there were vitamins in honey.

At this point a young man arose and announced with an air of finality, "There are no vitamins in honey," and went on to cite the report of the feeding experiments of R. Adams Dutcher, which proved that the amount of water soluble vitamin was negligible in honey.

Nearly burst a blood vessel just then. You see, altho I adopted California after my visit here a year ago, it has never adopted me; and, therefore, I had no right to speak in a California beekeepers' meeting, even if brave enough to attempt it.

However, after the meeting I had a pleasant talk with Prof. McCharles, and came to the conclusion that he did not mean quite all he said, that he thought honey producers were a bit chesty over their product and enjoyed shocking them. I imagine, anyway, he is slightly cynical about the need of more vitamins and soluble mineral salts in the modern diet.

MANY people have the delusion that a person who can write a little can also speak in public, and the committee therefore invited me to talk on Friday evening. Of course my subject was "Vitamines in Honey;" and I am going to say right here that if my brother, E. R. Root, finds many such friendly, appreciative, and intelligent audiences I don't wonder he has formed the habit of speaking at beekeepers' meetings. One of the first to come to me and introduce himself, after the meeting was over, was the young man who had announced in an earlier session that there are no vitamins in honey.

He is a professor of chemistry, physiological chemistry, I think, in the University of California, and his name is Clark. He seems keenly interested in bee culture as well as chemistry, just the sort of man who can be invaluable to the industry. He said he was familiar with the research work of Philip B. Hawk as well as that of Dutcher; but, believing that the fat soluble content of comb honey is the wax, he felt justified in saying there is none in honey, and he spoke with that air of finality because it was his classroom manner. It is funny now, but it spoiled the better part of a night's sleep for me at the time.

One can always learn something valuable in talking with such a man. Here is a point he brought out: When excessive amounts of honey are eaten laboratory tests show that the system is unable to make use of

it and the kidneys eliminate it. I have always felt that there is danger in urging people to eat honey in large amounts at a time. The best of foods should be used in moderation.

Let me add that Prof. Clark by no means shares the views expressed by Prof. McCharles concerning the food value of honey, its digestibility as compared with sugar syrups, etc. And you and I know that many eminent chemists and nutrition experts have also endorsed honey as an easily assimilated sweet of high food value.

THERE were a number of enthusiastic women attending the beekeepers' meetings in spite of the fact that I was told there are comparatively few women beekeepers in the State, that honey producing is now largely in the hands of specialists who do it on a large scale. Some of these women apparently were successful amateurs, and some were efficient partners of their beekeeping husbands. One of the latter (Mrs. Stuart) being unable to appear in person on the program, sent her paper on "The Uses of Honey in the Home." It told many of her experiences in retailing honey from her home and was very interesting, humorous, and valuable. When I heard it read I said to myself, "Staney P., here is where you take a back seat;" for she uses honey in her household to an extent I have never dreamed of doing, and am afraid never shall, as neither my family nor myself like honey combined with certain fruits and flavors. I believe Mrs. Stuart stated that she bought no sugar whatever for household use.

She wrote about sunshine preserving with honey. Doesn't that sound appetizing and so appropriate? Her instructions were to use a pound of honey for every pound of fruit, mix them, spread on platters, put the platters in a box slightly higher at the back than the front, cover with glass, and place in the sunshine on a bench or chair with its legs in water to prevent the entrance of ants. Small fruits could be preserved whole, but large fruits should be cut in convenient pieces for serving. When the preserves are thick they should be put into sterilized jars and sealed or covered with melted paraffin.

Sunshine preserving is doubtless easier to do in California than the East, but I am surely going to try some honey sunshine preserves next summer.

ASIDE from the meetings in the auditorium the visiting beekeepers were royally entertained by the Alameda Beekeepers' Association. Automobiles, including the mayor's official car, were at our disposal for rides thru the various Bay cities. We were taken to the University of California and escorted about its beautiful campus and thru many of its departments, and finally we were entertained at luncheon in the Hotel Oakland, in honor of the president, J. E. Pleasants, and the members of the State Association. Mr. Pleasants, by the

(Continued on page 243.)

LIFE'S years are filled with wonderful beginnings. There are the New Years' Days themselves, like wide gates opening into

fresh fields, inspiring first days of months, radiant first days of weeks, and every day of them all with its own miracle-working morning. But of all beginning-times, Nature's own favorite is surely the spring. To what great tasks does she then set her mighty invisible hands!

Happily, the spring season is not only the most pleasant time to begin keeping bees. It is also the most practical; particularly if the new beekeeper be wise enough to have read widely on the subject during the preceding winter, so that he may know something of what to expect and a little of what to do. Then when he first opens his newly acquired hive, when plum trees are like fountains of white beauty and peach trees are all a sudden blush, how much more intelligent will be this first rapturous look at the marvels therein. Moreover, he will know how to go about it all. He will have acquired a smoker and a hive-tool and a veil. And as some tremulous day nears the noon hour, when he knows from his reading that many bees will be out in the field, thus making an examination of the hive easier and more pleasant, he will light his smoker and put on his veil, puff a whiff of smoke in the entrance, and with his hive-tool gently remove the cover. Carefully he will separate the combs, pushing part of them close against one another to leave room to lift one out, slowly and quietly, that the bees shall not be crushed or irritated. And there he will find just what his books told him he would find.

For, made wise by his reading, he will have been particular to buy at least his first colony in a modern movable-comb hive. These hives are very simple and easy to operate. The beekeeper buys them all ready to be put together, every part cut to the most carefully accurate dimensions, and finds much of his pleasure in the assembling and nailing of them. Everything is movable. There are separate bottom-boards and covers and hive-bodies. The beekeeper provides himself with extra hive-bodies, either full-depth or shallow, so that he can raise the hive cover, at any time, and put on one of these extra bodies, which forthwith becomes a "super." Thus he adds to the capacity of his hive. Inside each of these chambers hang frames, usually ten, that hold the combs. When new, each frame is given a "full sheet of foundation," a thin sheet of beeswax, stamped with the impress of the hexagonal cells of the honeybee and

Beekkeeping as a Side Line

Grace Allen

cut to the right size. On that sheet of wax foundation the bees build the comb straight and perfect, with cells of the size most valuable to beekeepers.

Outside of flowers, there are few things so delicately beautiful as newly built honeycomb. And the mystery of its making is as baffling. We may explain as learnedly as we will, or as we can, cells and glands, protoplasm and metabolism, chemical changes and vital processes. When the best informed of all the human race has exhausted the subject, he can not make one cell of honeycomb nor one tiny particle of wax. The most becoming thing he can do is to yield it his most generous and ardent admiration, letting the marvel of it and the beauty of it thrill to his very fingertips, as he looks at its waxen wonder, so fragile, so fragrant, and so clean. This is while it is new. With the years it grows stronger, tougher, darker, less like a thing fashioned by fairies.

Yet this fairy-like new comb, built by young bees in the dusk of the hive, this thing of mystery and translucent beauty, was made for definite practical use, for two supreme purposes—yea, even three.

In those waxen cells the bees store the nectar. Fitting urns, indeed, they are for this marvelous gift of liquid fragrance and light borne by silken wings from the cups of sun-blessed flowers. Spread out in these thousands of six-sided vats, the thin nectar is gradually evaporated, slowly and steadily transformed into rich, ripe honey. The mouths of the urns are then sealed over as with white silver and the comb has become the inviolable vault for the priceless treasure of the hive. Thus it fulfills one great end of its intended destiny.

In other of these cells are packed the many-colored pollens, gay rainbow-like dust from the hearts of the flowers. This is a lesser usage for the comb, yet a very important one, as pollen is a vitally essential food for bees, being required in especially large quantities during the period of heavy "brood-rearing" while thousands of larvae are making their rapid growth.

The other great purpose of the comb is to cradle the young. A certain part, somewhat like a carelessly curved sphere, is set apart in the inmost center of the hive as a nursery. Here in cell after cell tiny eggs are deposited, wee ivory specks that contain the unbelievable promise of future eyes and legs, gauzy wings and strange incomprehensible instincts. The egg hatches into a diminutive helpless larva that cannot leave its cell, a wee white baby worm that curls up in its cradle, is fed constantly and generously and does nothing but grow. Until,

behold, the time quickly comes when it nearly fills its cell, whereupon the bees cover it over as with a brown blanket, and leave it in darkness and warm close silence to finish its development. And when some later day it cuts its way out into the crowded restless life of the hive, it is a bee like other bees, head and thorax and abdomen, legs, antennae, wondrous wings.

In the spring, at the time that our beginner is taking his first breathless look inside a hive, the colony may consist of 10,000 bees more or less, probably more. The long winter has seriously reduced its numbers, and now all efforts of the bees and the beekeeper alike must tend towards bringing it up to its normal summer population of 60,000 to 70,000 or more. But one amazing thing is that all the bees in the hive in early spring are females—one alone wonderfully and significantly different, the rest all alike.

Indeed at any season of the year, however large the population of the hive, the great overwhelming majority of them are peculiarly developed females, quite properly known as "workers." The future of the race depends upon their labor, but not at all upon them themselves, in any reproductive sense; for they do not mother it. They are unable to mate and normally lay no eggs. But everything else that is done in this strange bee home, is done by these unresting workers. They feed the ever-hungry larvae; they keep the hive clean; they stand at the entrance as sentinels, challenging each incoming bee and forbidding the way to enemies; concealed in the ends of their bodies are sheathed weapons like poisoned darts, with which they defend the precious home with its babies and its treasure, often yielding their lives in the act; with incessant beatings of their wings they ventilate the hive by driving constant currents of air thru it. It is the workers who make the wonderful wax for the combs, hanging dense and still while drop by drop exudes from the wax-glands on the lower sides of their bodies, hardening as it strikes the air. It is the workers who flash across the light on tireless wings, who with their long tongues reach the nectar in the flowers, bring it to the hive in special honey-stomachs, ripen it in innumerable urns, and seal it with the sacred seal. It is the workers who collect the pollen, carrying it home in great balls on their legs, as tho in saddle bags. It is the workers who bring in water and who gather strange tree gums, known to beekeepers as propolis, to smooth over rough places in the hive or to glue up cracks (even those the beekeeper doesn't want glued up!). And it is the workers who give of themselves so freely, with such a spendthrift generosity, that in the height of their working season they seldom live more than six weeks. Six weeks of tireless devotion in the sweet-smelling shadowy hive, and of dauntless flight on swift frail wings thru sunlight to

distant flowers—and they are gone—faithful wings ragged and worn. Six weeks of song, blended of eagerness and content—and they are silent, forever.

The one strangely different individual (in the spring the only bee in the hive besides the thousands of workers) is also a female, yet utterly different from the workers. Her long beautiful body contains the hope of the race, for she and she alone, in each hive, is the mother of all the rest. Beekeepers, more happily than logically, call her "queen." Tho she by no means rules the hive, yet the circled retinue of workers always around her and their apparently tender care of her make the term gracefully appropriate. She performs none of their tasks, lacking the physical equipment for honey-gathering and pollen-bearing and wax-secretion. When a queen is about a week old, she makes one dizzy nuptial flight up, up, up into the glory of sunlit spaces. Then mated and matronly, she settles quietly down to her appointed destiny of egg-laying. In cell after cell she deposits the ivory-white eggs, until thousands and thousands of bees have emerged, while thousands of others lie in their covered cells, or in open ones, still being fed; and still she lays on. Sometimes at the height of her laying period she may lay two or three thousand eggs a day. But never again, unless in company with some future swarm, will she know the rapture of wings and sunshine. In the dusky hive, she may live several years, while her multitudinous families of shorter-lived sun-loving children flit thru their little day and disappear.

One of the wonders of the queen, too, is that some of these very same eggs that develop into unnumbered workers may, merely by the use of a larger cell and a difference in the feeding during the larval stage, be developed into other queens, who, mating, become themselves mothers of teeming hives. And another wonder is that in later spring and summer the queen lays, in addition to these female-producing eggs (and in far lesser number), eggs that produce males.

Male bees are known as "drones." They do no work at all. They don't even defend the hive. They are made that way, tho; they haven't even a sting. They are big-bodied—coarse-looking—heavy feeders. They have immense eyes that meet on top of their heads and strong powerful wings. The drone exists for one purpose only: in the act of achieving this by mating with a young queen in mid-air, he dies. Unless restrained by a wise beekeeper, every hive produces these honey-consuming undesirables with a strangely unnecessary prodigality. Then, as the honey flow declines, they are relentlessly disposed of. The workers attack them bodily or drive them from the hive or refuse them entrance when they come swaggering back, gay and carefree, from some romp in the summer sun. Thus perish the drones.



FROM NORTH, EAST, WEST AND SOUTH



In Southern California.—The California beekeepers have one more crop to market thru the Exchange under the present contract. When the new contracts are written up, there is every reason to believe that there will be many improved features. For instance, the the beeswax pool at present contains all of wax for the year. Many of us think that there should be two or more pools, making it unnecessary to wait a whole year for the final returns, if one puts wax into the warehouse in January or early in the season. To show the increasing popularity of co-operative marketing, when the California marketing act went into effect, there were but five marketing organizations. In 1919 there were 35.

The orange growers are inclined to leave the fruit on the trees as long as possible this season, owing to the low prices and the poor market conditions in general. Just what effect this will have on the buds and blossoms, it is impossible to tell at the present time. A tree, with an abundance of moisture surrounding the roots, blooms much more freely and the bloom stays on much longer than where the ground is somewhat dry. As long as the fruit remains on, it is sure to take considerable substance from the tree. We can hardly expect the average of the past three years to be kept up in the orange honey flow, as we have been exceptionally well favored.

The bees are in a fairly good condition. Perhaps they are a little short of stores in some of the apiaries; but, with good weather conditions from now on, most of the ranges will furnish a living for the average colony. Disease is well under control, and only occasionally an apiary is found where it is at all bad. European foul brood crops out at times, and it will be well to keep a close lookout for this enemy until summer. It comes on very rapidly at times and often does much damage before it is discovered.

Prof. Ralph Benton, of the faculty of the California State University at Berkeley, gave a very interesting talk before the beekeepers of Riverside County recently. He said that co-operation today is a movement toward success along all lines of production. Publicity is all right, but the industry must be built up by lowering the cost of production. The dairymen found out by careful tests that their profit was all coming from 50 per cent of their herds, the other 50 per cent being kept at a loss or barely paying expenses. Mr. Benton said that he often wondered if our profits do not come from 40 per cent of our colonies. There is no doubt but that great improvement can be made by the proper selection of stock and by paying closer attention to detail work.

A range is often crowded because one man has made a success on it; when, if the

facts were known, it is the beekeeper and not the range at all. The beekeepers of Orange County have a department of the Farm Bureau whose duty it is properly to locate apiaries and to adjust locations in and near the oranges. There is a great chance for co-operation and education in getting ready for the orange flow.

Beekeepers should keep records in order to know what it is costing them to produce honey. When our committee was asking for tariff protection on honey, they were asked, "What does it cost to produce honey in these United States?" And no one could answer. Can you? We will venture to say that not 10 per cent of the beekeepers in the United States can answer the question with anything more than a guess. One man paid \$1200 for moving his apiaries and made \$1300 worth of honey. Did it pay?

There are 5640 students taking the various agricultural correspondence courses of the State University extension work. Last year only 300 students were taking beekeeping—not a very large per cent.

J. D. Bixby in the Honey Producers' Co-operator says, "A careful survey of the Covina citrus district, the first week in February, failed to find a single available bee location more than one-half mile from a large commercial apiary already located." This includes a large territory.

Corona, Calif.

L. L. Andrews.

* * *

In Texas.—February has been adverse to the best development of the honey plants. Eastern and north central Texas have received a normal amount of rain and there the conditions are normal. The rest of the honey-producing area has been too dry. Horsemint has suffered so that it is doubtful if there will be much horsemint honey this year. A frost the latter part of the month injured the agarita somewhat. The rain coming at the end of February gives hope for a good honey flow from spring annuals. Everything indicates a honey flow from mesquite. All things considered, the prospects for a honey crop are good, but one equal to last year cannot be expected.

With the Biological Survey and the various farm organizations calling attention to the absolute necessity of fighting rats and mice, we again have to report the work of the rats on the honey plants in the Southwest. There is an area extending from Uvalde to Crystal City in which very conservative beekeepers estimate that from 2/3 to 9/10 of the huajillo and catsclaw has been killed by the rats peeling the bark from the brushes. These same men have given up hope of a honey flow from this source. The mesquite, however, was not attacked. It is suggested that the residents in that district get in touch with the Biological



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Survey at Washington and by their aid start a campaign against the rats.

All beekeepers of Texas who expect to ship package bees or queens are warned that many northern States have quarantine laws, and some of these States have announced that no bees without proper inspection certificate can enter their borders. As Texas provides free inspection, take no chance, apply to Dr. M. C. Tanquary, College Station, Tex., for inspection, stating that you expect to ship bees.

Every little while someone discovers a new cause for foul brood. Texas has had her quota of these, but California has a new one. A well-known beekeeper writes in the Western Honey Bee that he has discovered that the organism which causes the foul brood, lives in the pollen of willows and like plants; it attacks man and gives him hay fever, causes all adult disease of bees and European and American foul brood in bee larvae. If this be so, it is useless to fight bee disease. Texas has enough faith in what she has accomplished to go ahead on the old line and not worry about this new explanation.

The Beekeepers' Short Course at A. & M. College, College Station, Tex., has been mentioned several times in these columns. The dates are July 25 and 31. The instructors will be from the professors of A. and M. College and the men from the experiment station. To aid these a number of the beekeepers of the State will give instruction along the lines in which they excel. A bee-man of national reputation will give one or two addresses. Five hundred beekeepers are expected.

L. W. Watson, the new State apiarist, is on the job. He has visited the various experimental yards and is now outlining the work of his department. He is very much impressed with Texas problems and is going to solve some of them.

A large number of our disputes and controversies are due to a lack of specific information. A fine example is the case of the huisache. Many honey producers give this tree as a honey plant, and others are ready to defend their claim that a bee gets only pollen from it. This misunderstanding comes from the fact that growing in the same localities from the Edwards Escarpment to Mexico, there are two plants very similar in appearance and size, having flowers of nearly the same color and shape, but one is nectar-bearing and the other is not. *Acacia farnesiana* Willd. (huisache) is seldom, if ever, a honey plant, while *Acacia tortuosa* Willd. (huisachillo) is a good yielder of nectar. The latter, however, does not occur in such numbers as the huisache.

San Antonio, Tex.

H. B. Parks.

In Iowa.—We have just taken a peep at the bees in the cellar, and from all appearances they are wintering finely. They are very quiet, and the mortality is, if anything, less than usual at this time of year. From present conditions, we shall be very much surprised, if they do not come out of the cellar in normal condition. In fact, if the weather continues the remainder of the winter as it has thus far, we expect the bees wintered outside to come thru in fairly good condition, provided they were supplied with plenty of good stores, as we have had no very cold weather and what little we have had has been for only a few days at a time. If the outside bees should winter well, it will undoubtedly give encouragement to young beekeepers to try it again, which would be taking long chances. Young Iowa beekeepers should not take this winter as a basis for future wintering. Many gray-haired men have never seen an Iowa winter as mild as this one, and it will probably be a long time before another rolls around; so better give your bees the proper protection than wish you had.

There is still plenty of honey in Iowa unsold, and the market is holding steady, but the demand is not heavy. With but few exceptions the beekeepers have kept their heads and not slashed prices, and it is well they did. While this holding the price steady may not allow us all to clean up the 1920 crop, it will go a long ways towards stabilizing prices for another year.

In a former article I stated that I doubted whether the slashing of prices would make any material difference in creating a demand. Since that time we have shaded our prices three times, and lately we have been offering fancy clover extracted at \$12.00 per 60-pound can at the apiary, and \$12.50 f. o. b.; yet we are selling no more honey than we did before we cut prices at all, so we have made up our mind just to "bide a wee."

While we have for the past 10 years sold nearly all our honey to the mail-order trade, we should like mighty well to see co-operative marketing come into vogue, and we would do all we could to help put it over in our State.

Conditions have changed very materially in the past two years as to this manner of selling honey. Excessive freight rates have done untold harm to our business. Naturally a trade of this kind takes honey in small shipments and must go at local freight rates. We have lots of customers to whom the freight in 200-pound lots adds 2c per pound to the price of the honey, and smaller lots proportionately higher. The price of containers is cutting into the profits or else adding to the price to the consumer. Shipping box lumber has doubled in price, and poorer quality at that. Our printing is quite



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an item for a small business, to say nothing of the labor required to take care of a lot of correspondence; and, unless conditions change, we do not expect to try to increase this trade.

The co-operative marketing would in many instances give the beekeeper a chance to have his cans and cases returned, which would be no small saving in handling a large crop. Carlot shipments would not be uncommon, and a big saving in freight would be the result. In many instances better distribution would result, which in itself would help wonderfully. In the meantime sell all you can locally.

W. S. Pangburn.

Center Junction, Ia.

* * *

In Ontario.—There has not been a day this past winter that autos have not passed our doors. That, in a nutshell, gives an idea as to our snowfall for the season. And we have had very little rain, too; so precipitation has been away below normal for this part of the globe. Continued freezing by night and thawing by day are doing a great injury to clover, on some soils at least; and, needless to say, this does not improve prospects for the beekeeper. Some correspondents have reported heavy consumption of stores; one beekeeper today wrote me that bees in his locality were almost out of food already. I have hardly looked at a colony since last fall, as the older I get the more careless I become about winter "tinkering." If they are not all right in the winter, the mischief is already done; so what is the use of knowing about the loss too soon and worrying about it? Do your best in the fall and then cease worrying, no matter what happens in the winter, appears to be a good motto for a beekeeper. Needless to say, if disaster happens and the cause is apparent, then do your best to overcome that another fall; for little can be done in the winter, so far as bees are concerned.

In the last paragraph of my correspondence for March *Gleanings* an obvious error occurs. Speaking of the difficulties in sending bees by express, it should say that many have ceased sending by that method—in fact, some absolutely refuse to send package bees into Canada by express under any consideration.

Honey markets are still dull, and prices are at least as weak as they were a month ago. But the demand for bees is very brisk, as nearly every mail for the past week has had inquiry for colonies of bees—most of these inquiries being from beginners.

Bees thruout southern and central Ontario have had a cleansing flight in most localities. All reports to date say that about all colonies are alive. I have been in but two of our yards for weeks, and so far have not noticed any dead colonies. In fact, we have had no severe winter weather for any length

of time, and, if bees had stores and were fairly well protected, I see no reason why they should die a year like this. But spring is young yet, and if stores have disappeared as some state, there is lots of time for fatalities during the next six weeks.

Experts say that the colder the weather the more bee activity, and hence more stores are used. Brood-rearing is also accelerated. Experience here in the North says that mild winters mean heavier consumption of stores than cold winters, if colonies are properly protected. Who is right? I venture to say that both opinions are in a measure correct, but the trouble is we are apt to get lopsided in our views and not consider questions like this from all angles. At any rate, I would rather have a fairly cold, even winter for successful wintering of bees than any other kind of climate that we can have served up to us here in Ontario.

A carload of sweet-clover seed was loaded at our station a few days ago, which was bought for \$3.50 per bushel, if I have the matter right. No wonder that farmers with a big acreage of this plant seeded for this year, are debating as to what to do with it. As to their decision, it is needless to say that any hopes we have of another sweet-clover honey crop are all dependent upon what action they take in the next two months.

For the past few days my son Edwin and his "Dad" have been at the wax-rendering game. While the weather outside has not been very cold, in the room in which we have been working, tho we had no thermometer to vouch for it, we felt as though the temperature was somewhere around 125 degrees F. Working over a steaming boiler the humidity makes itself felt more than the mere heat, and we certainly have had a bleaching. We have fixed up over 1000 pounds of wax mostly from cappings, and while it is hot work, yet there is something about the job we do not dislike, provided it does not last too long.

For the cappings we have tried many plans, but have settled down to the single-cheese unheated press. For old combs, while we at one time condemned the hot-water press—known here in Ontario as the Sibbald press—at the present we would not use anything else for the job. At the first trial, some years ago, we did not know how to use it and made a mess of things; but, after "learning how" we pronounce the hot-water-surrounded press as the only real method for getting out nearly all the wax from old combs. Just the other day I met a friend who runs about 100 colonies who stated that he had never used a press of any kind. If anyone knew just how much wax was thrown away by some of the crude rendering outfits still in use, many wax presses would be bought at once.

J. L. Byer.

Markham, Ont.

HEADS OF GRAIN FROM DIFFERENT FIELDS

Two Timely Hints.

While diagnosing the condition of the colonies during the early part of the season from the flight of bees at the hive entrance any unusual observance, such as less activity in certain colonies while others are busy, indicates that something is wrong. On examining such a colony with plenty of bees and a good queen there will likely be found a large amount of mostly old brood, but a meager amount of stores left, causing the bees to be inactive and not inclined to leave the hive in search for nectar; while other colonies with plenty of stores are eager to obtain more, even when only a small amount of nectar and pollen can be gathered. Such colonies, if not given more stores, may eke out a bare existence by restricting brood-rearing. They will be far behind colonies that were well supplied. Moral—prevent such a condition by plenty of stores at all times.

While examining colonies for the purpose of ascertaining the amount of stores, clipping queens' wings, etc., in fact, for any purpose, it is well to keep watch for any imperfect or otherwise objectionable combs. If any such are found, they should be removed at once if free from brood or eggs. If they contain brood the top-bar should be marked, and later, when weather will permit, these combs should be moved to one side of the hive. The chances are they will soon be free from brood, after which they can be taken out of the hive. Every poor or imperfect comb replaced by a good one now means more bees for the honey flow. Sometimes a comb may be badly clogged with old pollen. Such combs should be removed, but remembering there must be some combs with considerable pollen for the colonies' welfare.

East Avenue, New York. A. C. Gilbert.

Spreading Brood in Spring.

It will soon be time to discuss spring management of bees, including the spreading of brood. This subject has been considerably discussed in different issues of *Gleanings*, and it appears to be a dangerous practice at times for the professional, and always for the novice.

Now my plan has always worked well for the last 10 years, and I can find no such fault with it as is often found in the others.

When looking over the hive in the spring see that the outside combs are filled with honey; note the position and number of combs of brood in the brood-nest, but do not disturb their order. There is this important point at this and each examination: See that the comb next to the brood (except the outside one) is empty. Just as soon as the weather will permit and there are bees enough to keep this comb warm the queen will lay in it, and you can then add another.

There will be no chilling of brood and no scattering of the cluster. After 12 years of practice I have not discovered any drawbacks. If this method does not spread the brood, either the queen is poor or there are not enough bees.

W. H. Miller.

Tivoli, N. Y.

Conditions Affecting Early Brood Rearing.

It is unnecessary to point out the peculiar, yes, remarkable weather that we have been having in the clover-honey-producing sections of this continent. Time and again my own bees have had a good cleansing flight, and I was of the opinion that bees were wintering well. At the same time, I felt that it was more than likely that they might consume an unusual amount of stores; so I determined to examine them early this year to see if they were running short.

On Feb. 23 I went to one of the apiaries enclosed by a fence eight feet high, removed the cover from the four-colony wintering case, and after removing the packing of forest leaves quietly turned back the duck cloth. Twelve colonies were examined in this way, and the bees in them appeared to be in fine shape, every colony alive and the bees quietly clustering and having a clean brook—all of which indicated good wintering. I left thoroughly satisfied that they were wintering well.

On March 2, when discussing this subject with Floyd Markham at his home in Ypsilanti, Mich., he was of the opinion that his bees were rearing brood. He said some colonies had for some time been carrying water; so we examined three of these. In one colony having a young queen, we found no brood. The second one, headed by an older queen, had brood in four combs. I noticed several cells which appeared as tho young bees had emerged from them, and there was capped drone brood. The reader can do his or her own thinking about this. The next colony had three combs with brood and quite a number of young bees.

My own bees are packed with thicker packing than Mr. Markham's. From the way my bees are clustered I doubt whether they are breeding at all, or as much as his; and, as the climate of Ypsilanti must be about the same as that of Brantford, I cannot help but wonder whether with thicker packing at the entrance of my hives the bees have not been less affected by outside temperature. It is my purpose to find this out very soon.

In any case beekeepers should take warning and find out as early as possible whether their colonies have plenty of stores. Many a beekeeper has lost colonies between April 1 and May 15, because they have been short of stores.

R. F. Holtermann.
Brantford, Ontario.

QUESTION. — Will there be any harm in giving my bees combs of honey that have mould on them?

S. A. Sears.
California.

Answer. — A little mould on the surface of the combs does not necessarily injure honey or render it unfit for the bees. A strong colony will quickly clean up a comb that is badly moulded, apparently without harm to the bees.

HOW MANY COLONIES NEEDED FOR ORCHARD?

Question.—How many colonies of bees are required per acre of ten-year-old apple trees to insure proper cross-pollination of the fruit?

Washington.

J. C. Hughes.

Answer.—Probably one or two good colonies per acre will be sufficient under favorable weather conditions; but, in the eastern portion of the country where rainy weather often interferes with the work of the bees, at the time of fruit bloom, a greater number of colonies would be needed. At such times the bees may not work very far from their hives, and it would be necessary in the case of a large acreage to have the colonies scattered thruout the orchard to insure proper cross-pollination.

RESISTANCE OF SPORES OF AMERICAN FOUL BROOD.

Question.—Does any authority know how much heat, gasoline, sunshine, rain, or any action of the elements will destroy the spores of American foul brood?

California.

Bruce Butler.

Answer.—According to White, U. S. Department of Agriculture, Bulletin 809, the spores of American foul brood remain alive and virulent for years in dry remains (scales) of larvae and pupae dead from this disease. They are highly resistant to most of the ordinary destructive agencies. They may be killed when suspended in boiling water (212 degrees F.) for 10 minutes, but they withstand more heat when suspended in honey or honey diluted with water. Spores of American foul brood suspended in honey may withstand a temperature of 212 degrees F. for a half hour or more under laboratory conditions. For this reason the advice is usually given to dilute the honey from colonies having American foul brood and boil it in a closed vessel for a half hour to render it safe to feed to the bees. The temperature of the diluted honey at boiling point is, of course, higher than that of boiling water, which is 212 degrees F. at sea level.

In his experiments Dr. White found that these spores, when dry, were destroyed by the direct rays of the sun in from 28 to 41 hours. When suspended in honey and exposed to the direct rays of the sun, they were destroyed in from four to six weeks. When suspended in honey and shielded from direct sunlight they remained alive and virulent for more than a year. The spores were not killed by fermentation in seven

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weeks, and they resisted disinfectants when used in the ordinary strengths, such as carbolic acid and mercuric chlorid, for long periods of time. Gasoline would

be of doubtful value as a disinfectant for American foul brood. The germs of European foul brood are much easier to destroy than the spores of American foul brood.

INCREASE PREVIOUS TO HONEY FLOW.

Question.—Is there any plan by which I can make two colonies from each of my colonies in the spring and build up both to full strength in time for the honey flow from clover?

Nebraska.

Harry E. Udd.

Answer.—Since it requires nearly two months for colonies to build up to full strength in the spring, there is not enough time to make increase and build up both divisions previous to the honey flow from clover in the North where the main honey flow usually begins in June. Where the main honey flow does not begin until July or August, this can be done if the bees have wintered well, since there is then time for both colonies to build up. In your locality it will be better to make increase at the close of the honey flow or during the latter part of the honey flow. Increase is often made from brood that would emerge too late for the resulting bees to take part in the main honey flow. In this way the honey crop from the main honey flow is not reduced, as would be the case if some of the workers that should take part in gathering the honey crop were used to make increase.

SECOND HIVE-BODY TO PREVENT SWARMING.

Question.—Is it a good plan to give a second story filled with combs at the time of fruit bloom to increase brood-rearing, and then at the beginning of the honey flow to put the queen into the lower story? or would it be just as well to run both stories for brood all summer? Would two brood-chambers stop swarming?

New Mexico.

O. Kopplin.

Answer.—Yes, this a good plan for producing extracted honey. The time of putting the queen into the lower story and confining her there by means of a queen-excluder will depend upon circumstances, but this is usually done soon after the beginning of the honey flow. Under some conditions after the queen is put down, it is better to put a super of empty extracting combs immediately above the queen-excluder and the former second story on top of the supers. This plan in some locations controls swarming almost completely, but it can not be depended upon to do so in all locations. One objection to permitting the queen to have the run of two stories thruout the season is the tendency of abandoning the lower story for brood-rearing later in the season when these combs are usually filled with pollen. Sometimes the lower corners of the combs are cut

out when they are not in use, then later these openings are filled with drone comb.

GIVING SECOND HIVE-BODY ABOVE OR BELOW.

Question.—In building up colonies in the spring when two stories are used for brood-rearing, should the second hive-body with frames of foundation be placed below or above the colony, or distributed in both?

Ohio.

Alan Eby.

Answer.—When only frames of foundation are given they should usually be distributed in both stories, with most of the foundation in the upper story. In fact, one or two frames of brood are enough to put into the second story, the remainder being frames of foundation. When empty combs are given to colonies that are strong enough in the spring to need a second story they may as well be placed on top, altho many beekeepers prefer to place them below if the weather is cool. A serious objection to placing them below is that the queen sometimes fails to go down and lay in the combs below even when crowded, especially when the upper portion of the combs in the lower hive-body is not suitable for brood-rearing on account of stretched cells. If the empty combs are placed above, the queen usually goes up readily if more room is needed, especially if old dark combs are used in the second story.

SHALLOW EXTRACTING SUPER TO PREVENT SWARMING.

Question.—How is this plan for comb-honey production? After unpacking in the spring, put on a shallow extracting super with foundation to provide more room for brood-rearing. Just before the honey flow, take this off and put on the supers. Would this do away with swarming? In the fall this super of honey could be put back before packing for winter.

Missouri.

John P. Drake.

Answer.—It will be better to have the shallow extracting supers filled with combs instead of frames of foundation, for unless there is an early honey flow the bees would not draw out the foundation readily. You can, of course, induce them to do this by feeding, if necessary. When empty combs or combs containing some honey are given above the brood-chamber early enough, swarming is usually delayed, because of this additional room; but, when this shallow extracting super is removed and comb-honey supers are given, the colonies so treated will probably prepare to swarm if the season is at all favorable for swarming. The additional honey which your plan provides for next spring is an excellent thing for spring brood-rearing. See article on Comb Honey Production in this issue.

GIVING ADDITIONAL ROOM FOR SPRING BROOD-REARING.

Question.—How can I give my bees more room for brood-rearing after the lower hive is full when I have nothing to put in the supers but sections?

Ohio.

Mrs. Arthur May.

Answer.—When your strongest colonies need more room for brood-rearing, previous to the honey flow, in producing comb honey, you will probably find some colonies that

still have some combs which do not contain brood or much honey. If you find any such you can exchange combs of brood, together with the adhering bees, from the colonies that need more room for the empty combs from the hives which are not filled with brood. In this way you can give your strongest colonies more room and at the same time help those which are less strong. When making this exchange be sure that you do not take away the queen with the combs of brood. The empty combs that are taken from the weaker colonies should have the adhering bees shaken back into their own hives.

CLIPPING QUEEN'S WINGS.

Question.—Is it best to clip the queen's wings early in the spring to prevent swarming?

Iowa.

Edward Melch.

Answer.—Clipping the wings of the queen does not prevent swarming. It only prevents the queen going with the swarm. This prevents the swarm from going away, since the bees will return when they find that the queen is not with them unless there happens to be another swarm out at the same time which has a queen that can fly. In such cases the two swarms may unite and later abscond if not cared for.

HOW MANY SUPERS NEEDED PER COLONY.

Question.—How many full-depth extracting supers will I need for each colony when using the standard 10-frame supers with eight combs in each super?

Illinois.

Louis F. Kasch.

Answer.—You may need only one super or you may need three or more, depending upon the season and the character of the honey flow. In some localities the honey flow is so slow and the nectar ripens so quickly that much of the honey in the super may be ripened and sealed before the first super is filled, in which case the ripest honey may be extracted and the empty combs returned, leaving the unripe honey (usually the outside combs) in the hive to be ripened and extracted later. If by doing this the honey can be fully ripened and at the same time there are always empty combs in the super for incoming nectar, a single super may be enough.

In other localities the honey flow may be so rapid that a single super would not furnish sufficient room for the thin nectar for more than a few days, and sometimes two or three supers may be filled before any of the honey is ripe enough to be extracted. Where the honey flow is short and rapid, as it is sometimes in northern Illinois, the beekeeper is usually too busy to do much extracting during the honey flow. In such cases the only way that the full crop of honey can be secured is to have on hand plenty of supers, in order that when more room is needed it can be given at once.

In the clover region many beekeepers prefer to leave all the honey on the hives until after the close of the honey flow. When this is done there should be three or more supers for each colony, to take care of the crop during a good season.

ON the first warm day in April the beginner will be interested to note the activity at the entrances of the hives of his newly acquired colonies. If they are strong, many bees will be seen going to and from the hives in quite a businesslike manner. Some of the returning bees will be seen with little balls of pollen on their legs as they run into the hives. This pollen varies in color, depending upon its source, and by watching the bees as they work on the flowers it is possible to learn to distinguish by its color the pollen from the various flowers. Some of the returning bees which appear to be heavily laden may be carrying nectar, while others may be carrying home loads of water.

Opening the Hives.

In the South the beginner can now open his hives to examine his colonies, choosing a warm day when the bees are working well; while in the far North it may be best to wait till early in May, but being sure that the hives are heavy with honey in the meantime. Opening the hives and taking out the combs for examination too early in the spring is sometimes detrimental, but even in the North this may be done without injuring the colony if it is done on a bright, warm day when the bees are working freely. When such a day comes the beginner may as well see the many interesting things that are inside the beehive.

Before opening the hive the beginner should see that his smoker is properly lighted and going so well that it will not go out when he quits puffing for a while; then he should put on the veil and tie it down so snug that no bees can get under it. The beginner will feel safer the first time if he wears a pair of good bee-gloves, tho later he probably will not use them.

Now try out the smoker again and if it is going well approach the hive at one side, not in front. It is well to give a light puff or two of smoke at the entrance to subdue the guards. This is not always necessary, and the beginner will soon learn to judge the temper of the bees at different times.

Remove the outer cover, if a double cover is used; then by means of the hive-tool pry the inner cover up at one corner, at first less than one-eighth of an inch, so smoke can be blown thru the opening without any bees being able to come out. Next pry the adjacent corner of the cover loose, then lift one end of it, and, as this is being done, blow in a few puffs of smoke under the cover and over the frames, being careful to send a little smoke to the far end of the hive before the cover is entirely removed. Lay the cover upside down in front of the hive entrance, so the bees that were adhering to it can readily crawl into the hive.

TALKS TO BEGINNERS

By the Editor

Now give a few light puffs of smoke over the tops of the frames (not down between them) to drive the bees down among the combs. The

amount of smoke needed will depend upon the temper of the bees at the time they are being handled, but only enough smoke should be used to keep them under control. Too much smoke stampedes the bees and makes it more difficult to handle them.

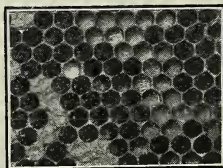
How to Take Out the First Frame.

If the combs are of the self-spacing type, crowd the entire set of frames, toward the opposite side of the hive by using the hive-tool as a lever between the first frame and the side of the hive. This will give a space for removing the first frame. If enough space can be made in this way, the outside comb may be removed first, but if this comb has attachments to the side of the hive or is bulged with sealed honey, it may be better to remove the second or the third frame first. Pry the frames apart far enough to permit the easy removal of the frame selected. It may be necessary to raise the first frame slightly, one end at a time, by means of the hive-tool in order to enable the operator to take hold of the ends of the top-bar with the fingers. Now lift the frame gently, being careful to avoid rolling the bees against the adjacent comb. When the first comb is out stand it on end, leaning it against the hive where it will be out of the way. Any or all of the remaining combs can now be removed and examined at will, but care should be taken to keep the bees constantly under control. After a little experience the beginner will learn when more smoke is needed, by watching the behavior of the bees. If many of them line up in close formation, with heads upward, between the top-bars of the frames, watching every move of the operator, they should be driven down again among the combs by a few puffs of smoke.

What to Look For.

Lift out a comb from the middle of the hive, hold it by the ends of the top-bar of the frame, and look it over carefully, as it should now reveal many things of interest. Note that some of the cells are covered or "capped," while others are open.

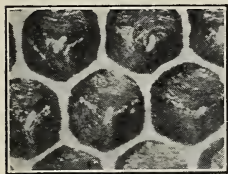
In the upper corners of the comb there should be some sealed honey. Note the appearance of the cap-pings; then, to be sure that this is sealed honey, tear a way the cap-



Capped brood in cells at the left, pollen in cells at the right.

ping from a few cells. Below the sealed honey there may be a few rows of cells of recently gathered honey.

Look for capped cells in the middle of the comb. This is sealed brood if the comb is from the middle of the brood-nest. To be



Eggs are placed in regular order by a normal queen.

sure of this tear away a capping and note that it contains an immature young bee in its pupal or late larval state of development. Note the difference in the appearance of the cappings of the brood and the cappings over the honey. In the middle of the area of sealed brood young bees may be seen emerging from the cells. Note how they first cut away the capping to release themselves.

At the outer margin of the area of sealed brood in the first open cells, look for the nearly full-grown larvae. Note their pearly white color which is characteristic of healthy larvae. Beyond the full-grown larvae, toward the outer edge of the comb, smaller larvae will be found. Hold the comb so the sun will shine down into the cells, and by looking carefully even the smallest of the larvae, those which have just hatched from the egg, may be seen.

Beyond the smallest larvae, eggs may be seen attached to the base of the cell. Note the regularity with which the eggs are placed in the cells, few if any cells being vacant. This tells you that the queen is normal and prolific. It is difficult, at first, to see the eggs and the smallest larvae, but by turning the comb in the light until it strikes the base of the cell these can be seen.

The arrangement of the brood of different ages, as described above, is not always present on all of the combs, because later when young bees emerge from the middle of the comb the queen will again lay eggs in these cells now surrounded by sealed brood. Later in the season this arrangement may be broken up entirely. Between the upper margin of the brood and the lower margin of the honey there are usually a few rows of cells containing pollen. This can readily be detected, being packed down in a solid mass in the cells. By looking carefully, cells may be found having two little pellets of pollen not yet packed down but lying loosely just as the worker left them when she kicked them from the pollen baskets on her legs.

By looking at the open cells it will be noted that little patches of comb usually in the lower corners of the frame have cells of greater diameter. This is drone comb, while the comb having smaller cells is worker comb. If the colony is strong there may be some drone brood present during this month, even in the North; while in the South drone brood, as well as emerged drones, can now

be found in strong colonies. Drone brood that is sealed has peculiar convex cappings, which resemble a layer of spherical bullets.

In some of the southern States, queen-cells built preparatory to swarming may be found in some of the strongest colonies at this time, but in the North these usually are not built until in May or June.

It is not necessary to tell the beginner that the vast majority of the bees on the combs are workers. If drone brood was found, there may be some adult drones among the workers. These large heavy-set bees may readily be found if any are present, and when one is found he can be picked up with the fingers without danger, as he is not armed with a sting.

The beginner may see the queen the first time he examines the colony, if he has been careful not to stampede the bees and thus frighten her so she hides away in some obscure corner. If the bees are gentle Italians the queen may go on quietly with her work, laying eggs, even while the comb is out of the hive.

How to Handle the Combs.

In handling the combs, all quick motions should be avoided. Do not move the hands across the top of the frames, but keep them near the ends of the hive. Bees resent any quick motions and may dart out to sting if the operator moves too quickly.

To look at the opposite side of a comb it should first be turned with the top-bar in a vertical position, still holding the frame by each end of the top-bar. The comb can now be turned on the top-bar as an axis, after which the top-bar is again brought back to a horizontal position, but this time the frame is upside down. This process is reversed in turning the comb back to normal.

What Can Be Learned by This Examination.

The presence of worker brood in all stages of development tells the observer that his colony has a normal queen whether he sees her or not. The presence of sealed honey in the upper corners of the combs and in a greater portion of one or two of the outside combs tells him that the colony is not lacking in its food supply. The presence of drone brood tells him that the colony is at least fairly strong and prosperous. The presence of many empty cells, if any, tells him that the bees do not need more room at this time.

In the northern States such colonies need only to be kept snug and warm during April, by seeing that the cover fits down all around, by leaving the winter packing in place, and by blocking down the entrance to about one or two inches in width and not more than three-eighths of an inch high.

In the southern States colonies may need more room this month. If the brood-chamber is well filled, outside combs and all, and the bees are elongating some of the cells in the upper portion of the comb with new white wax built on the old dark comb, they need their supers, which should be put on without delay if the bees are working well.

THE principal time for making honey in this locality is in the fall, altho occasionally we get a fair spring flow from white clover. This,

however, is very uncertain. We have not a sufficient amount of sweet clover in this community to be of any benefit from the standpoint of the beekeeper, and it seems that the farmer is adverse to sowing it, and no one seems to push this matter here; so we have practically nothing to depend upon when the white clover fails. Our main source of honey is the angel-pod vine or blue vine which grows very abundantly along the Ohio river bottoms. This, of course, does not come until fall. However, I believe that, with the proper support and co-operation between our county agent and the farmers, this community could be made an ideal one thru the planting of sweet clover."—R. W. Grone-meier, Posey County, Ind.

"No more two-story wintering for me. No more slab honey feeding even with combs scraped and honey dripping. I could not get the pep into them this way. I go back to my old way of spring stimulating. This slab business is probably all right for the big boys with hundreds or thousands of colonies, but I don't believe it is good for the sideliners who want a big yield from a few."—A. W. Lindsay, Wayne County, Mich.

"A certain honey salesman in one of the western States devised a unique way in which to dispose of extracted honey. He rigged up the delivery box on the back of his Ford runabout, so that two five-gallon cans of honey could be set on and liquified, and kept liquid, by the use of the exhaust gas. There was a shut-off in the pipe just before it reached the cans of honey, so that it could be turned off before heating the honey too much. The salesman, referred to, sold 7,000 pounds of honey at 25c a pound in a little over three weeks, by going from house to house in a city of 3,000 people, and delivering honey in whatever containers the customers supplied."—George W. York, Spokane County, Wash.

"On Saturday, Feb. 12, Home Economics Day was celebrated at Iowa State College. This annual event is prepared for by more than 1000 girls and looked forward to by 2500 boys. One of the exhibits was bees and honey. This was on a large table and attracted the attention of every one who visited the building. There were those of the girls who expressed the desire to see a real queen with her circle of attendants and those who loitered around the observation hive for a farewell glimpse of the royalty. Some of the boys were interested in the

BEES, MEN AND THINGS

(You may find it here)

samples of honey collected from California, Utah, Louisiana, Florida, and many other States. Often those of artistic turn of mind admired the oil

painting made by Dr. A. F. Bonney. There were housewives who were very much interested in the grades of extracted and comb honey, as well as the commercial packages of honey. All of these phases of the exhibit had a special class of interested spectators, but there was not a single visitor who was not interested in the wonderful display of cakes, cookies, and candies made with honey. The girls viewed with envy, the boys viewed with a lingering longing, and the housewife with serious interest."—F. B. Paddock, Story County, Iowa.

"The winter has been so dry and mild that I could not retain the bees in the cellar any longer. Today (Feb. 24) I removed them. They are very populous, with brood in all stages in every one examined except one which is queenless. The thermometer today at noon registered 72 degrees F., and the demand for water by bees is indication that brood-rearing must be very well under way. Rose bushes and lilacs are beginning to show leaves."—A. E. Trapp, Fergus County, Mont.

"We have just concluded a series of short schools in beekeeping in western Washington. We have held a series of one to three day schools at Wishka, Elma, Olympia, Puyallup, Seattle, Shelton, Everett, and Bellingham. The average attendance has been about 80 for each locality, and at Seattle we had an attendance of 360 at one of the sessions. Seattle had over 200 bona fide beekeepers in attendance. I believe we have made a record—at least for the Northwest, in getting so many beekeepers together under one roof. This work has been put on by the State Division of Apiculture, co-operating with the extension service of the State College and with the local farm bureaus."—Dr. A. L. Melander, Entomologist, Whitman County, Wash.

"I have my bees outdoors packed in three different ways, and some not packed at all except for the double-walled hives, and invariably the ones in the packing cases are out for a flight from one-half to an hour before the others. My packing cases have four inches of packing on the bottom, six at the side, and eighteen on top."—Frank R. Huff, Cook County, Ills.

"All my bees came thru winter all right, and several had young drones flying 5th of March—something unusual in this locality. They were working today like the good old summertime."—A. C. Smith, Columbiana County, Ohio.

IT is now proposed to change the name of the "annual sweet clover" to that of Hubam, this word being suggestive of Hughes and Alabama, thus bringing to mind at once the name of Prof. Hughes, who discovered this wonderful new plant and traced it to its native home in Alabama.

* * *

Latest reports by wire state that recent copious rains in southern California make a good crop from sage almost certain; and, just as we go to press, a telegram from Texas reports fine prospects from mesquite and horsemint.

* * *

Prof. Wilmon Newell has been appointed Déan and Director of the College of Agriculture, University of Florida at Gainesville, Fla. This means much, not only for beekeeping in Florida but for beekeeping in general, as Prof. Newell is at heart, first of all, a beekeeper. He will continue in close touch with Florida beekeeping, and probably continue in charge of the inspection service of that State.

* * *

Cary W. Hartman, the enterprising president of the Alameda County (California) Beekeepers' Association, was unanimously elected president of the California State Beekeepers' Association at the final session of the State convention on March 5. Mr. Hartman succeeds J. E. Pleasants of Orange County. M. H. Mendleson of Ventura was elected vice-president, and L. W. Lassell of Oakland, secretary-treasurer.

* * *

Beekeepers who need help should inquire regarding the Federal Board for Vocational Training and its activities. This board has charge of re-educating for new duties men who have been partially disabled in the World War. Many men have been studying beekeeping in the various colleges and schools. These men are ready for "placement" or field training with commercial beekeepers during the season of 1921. The obligation the beekeeper takes in exchange for the help given by these men is to see that an opportunity is given to learn methods of honey production, queen-rearing, etc., in actual practice. The board pays them a living salary. Beekeepers who wish to use these men and thus give them a lift over their difficulties in re-establishing themselves should investigate this opportunity at once.

* * *

According to an Associated Press dispatch from Berlin, the number of colonies of bees which the Entente demanded from Germany in reparation is 25,000. It appears that the German representatives have made



counter proposals to the reparation commission as to the number of bees, Belgian hares, and dogs to be delivered, and that a decision as to the exact

number has been postponed for a month. The ship carrying the miscellaneous assortment of animals, which are being demanded from Germany, will have almost as great an assortment as Noah's ark.

* * *

The following proclamation was issued by Governor Stephens of California on Feb. 26, 1921:

"Whereas, California leads all other States in the production of bees and honey, and boasts in this activity an industry bringing in a revenue of \$3,000,000 annually to this commonwealth, and

"Whereas, The California State Beekeepers' Association, which is responsible for the upbuilding of this valuable and productive industry in the State of California, will hold its thirty-second annual meeting in the city of Oakland, March 2, 3, 4, and 5.

"Now, therefore, I, William D. Stephens, Governor of the State of California, having the welfare of all California industries at heart, and believing the honey industry to be one which should receive the co-operation of our citizens, do hereby designate March 1 to 7 as California Honey Week, and appeal to all citizens of the commonwealth to patronize products of the beekeepers of the State during that period.

"William D. Stephens, Governor.

"Dated: Sacramento, Feb. 26, 1921."

* * *

The committee having charge of the Dr. C. C. Miller Memorial submits the following:

Regarding the subscriptions of beekeepers to the C. C. Miller Memorial fund, it is desired by the committee to secure at least \$5,000 to establish a scholarship bearing this name; using only the interest of the money gathered, annually through a trustee committee, for a scholarship in beekeeping and allied sciences. Altho it was first suggested by Gleanings that the subscriptions be limited to \$1. it has been decided not to put any limit upon the amounts to be accepted, but as small a sum as 25 cents will be welcome. The members of the committee, named below, will receive the funds. All the amounts will be acknowledged in the American Bee Journal or Gleanings, or both. It is desirable that the greater number of subscriptions be forwarded by subscribers before June 10, at which date Dr. Miller would have been 90 years of age. It behooves the beekeepers of America to thus celebrate the anniversary of this great man, who is acknowledged by the beekeepers of the entire world as one of the most deserving members of the craft. We shall be glad to have the other bee magazines lend a hand in this and publish such lists of subscriptions as they may be able to secure. If all pull together, we should secure a worth-while sum. Send subscriptions to: C. P. Dadant, Hamilton, Ill.; B. F. Kindig, East Lansing, Mich.; E. G. LeSturgeon, San Antonio, Tex.; Dr. E. F. Phillips, Washington, D. C.; E. R. Root, Medina, O.

ON page 754 of the December Gleanings I mentioned J. H. Miller of Newark, O., the man who had just "built a synagogue." Well, during the Sunday afternoon Ernest and I spent at his home he gave us many important lessons and facts in regard to "civic government." His sudden death shortly after calls forth this Home Paper. The following is taken from the American Issue:

Former Senator J. H. Miller of Newark died at his home in that city Dec. 6th. Mr. Miller was the leader of the dry forces in his home city some years ago when it required moral and physical courage to be prominently identified with the Prohibition cause.

No other town in Ohio was dominated by a worse gang of wet ruffians than was Newark a dozen or fifteen years ago. The members of this gang not only ran the saloons, but the officers and the town as well. They had no regard for law or decency. They were brutal and defiant.

Mr. Miller stood out as the leader of the moral forces of the community during those dark years. He was unassuming and mild-mannered, but he was not afraid. He fought that wet crowd thru the years. They tried to destroy him and his business. They attacked him one night with the evident purpose of killing him, and they almost succeeded, for he carried to his grave evidence of his struggle.

This was about the time the attention of the country was directed to Newark by reason of the lynching of a dry detective by a mob directed by the saloonkeepers. It was the beginning of the end. Prohibition came to Newark, the old wet gang was scattered, and a new and better day dawned on that busy little city.

Mr. Miller often remarked in the more recent years that God was good to him to permit him to live to see the new Newark, and to have its people realize the blessings of Prohibition. Not only did he live to see the change, but his fellow-townsmen and his district honored him by electing him to the Ohio Senate where he served with credit to himself and his constituents.

But nothing in his official life overshadowed what he accomplished as the dry leader of Newark in the days when such leadership invited death itself.

The following from one of the great men of our day gives us some further light in regard to the man:

My Dear Mrs. Miller:

I did not learn of your husband's death until I passed thru your city last Thursday. I am greatly shocked and distressed at the sad news.

I prized his friendship and appreciated his high character and sturdy citizenship. His death is a loss to our party and his State. To me it is a personal grief. I share your sorrow.

With sincerest sympathy, I am,

Very truly yours,
W. J. Bryan.



The wages of sin is death; but the gift of God is eternal life.—Rom. 6:23.

Thou shalt not kill.—Ex. 20:13.

For he loveth our nation, and he hath built us a synagogue.—Luke 7:5.

In the American Magazine for April, 1911, appeared an article by Ray Stannard Baker, entitled "The Thin Crust of Civilization: A Study of the Liquor Traffic in a Modern American City." From this article descriptive of the Newark riot (July 8, 1910), I make clippings

as below:

One night they threw beer bottles thru the windows of Judge Seward's home; another night they attacked Secretary Mitchell's house; they sent threatening letters; and finally, one evening not long before the riot, three thugs followed J. H. Miller thru the streets and just as he reached home assaulted and beat him brutally, knocking in his teeth. He wears the scars to this day.

While the iron doors of the jail were being beaten down, and while the man, Etherington, was being taken from the jail and hanged at the corner of the courthouse square, this man, wearing the uniform of chief of police, was then at a nearby grocery and saloon, in company with others, engaged in a social game of cards.

I went to the county jail, where all the men who had been caught were locked up. It was one of the most tragic sights I ever saw in my life. I had expected to find a group of hard-looking rowdies. Instead of that, most of the prisoners were scarcely more than boys—"just town boys," the sheriff said. One, charged with first degree murder, was only 17 years old, two were 19, two were 20, two were 22, two were 23 and two were 24. The others were mostly under 30 years old—just full-blooded, adventurous, excitement-loving boys. Most of them had been educated right there in the public schools of Newark and had grown up there—ripe products of the Newark system.

What a farce it all is! Spend thousands yearly in schools, boast about enlightenment, and turn boys and girls loose for amusement in a town infested with 80 saloons and 30 or 40 houses of prostitution! There were half a dozen or more schools in Newark, 16 churches, one feebly-supported Young Men's Christian Association building, no playgrounds, no library building at all—and 80 saloons, occupying the best business sites in town and working day and night!

During that eventful Sunday afternoon Mr. Miller gave me some important facts in regard to the Newark tragedy that I think have never been published. I asked what afterward became of the leaders of that gang of anarchists. I think he counted up a full half dozen who committed suicide. Sad to relate, quite a few women took part. While poor Etherington was being drawn up by the rope, one woman yelled, "Pull him up higher, so we women folks can see him." This woman was a suicide inside of a year. See our first text. "The wages of sin" are not always paid "every Saturday night,"

but they are *sure to come*, sooner or later. I may not have got it correctly, but I think the chief of police who played cards, while the mob ruled the town, was one of the officials who committed suicide. Is there any lesson, right here, for *other towns* besides Newark in our State of Ohio?

Just recently a prominent *judge* in the great city of Cleveland, Ohio, admitted in court he visited saloons after midnight, and drank *brandy*. This in our Ohio where prohibition is supposed to rule!

Just think of it! A judge, who holds the destiny, the happiness, and even the *lives* of good people in the "hollow of his hand!"

Now for something a little pleasanter. Mr. Miller, as soon as he learned we were in his city, took us to his church and his Sunday school. On the way he explained he found in the suburbs a residence which they had changed over into a church. Of course, the ground and building were paid for by subscription, but Miller was "prime mover."

He explained before and after services how the changes were made. He took us into the basement, showed us the up-to-date furnace, and what greatly interested me was comfortable toilet rooms for both sexes. When you get to be 80 years old or more, you will surely appreciate things of this kind if you never have before. Ernest and I were both called upon to talk to one of the brightest big Bible classes it was ever my fortune to see. I wrote home to Mrs. Root my right hand was sore yet from the many "hand-shakes" and hand "squeezes," the latter mostly from the *women* folks.

This man Miller was a *lawyer*. How many lawyers have we that are even *followers* of the Lord Jesus Christ? Is there not a new order of things coming, along this line?

Was I not right in quoting in regard to friend Miller,

"For he loveth our nation and he hath built us a synagogue"?

HIGH - PRESSURE GARDENING

FLORIDA NEW POTATOES, \$4.80 PER BUSHEL.

I see by the Cleveland Plain Dealer that potatoes are "away down" up North; but, in the same daily, I see, also, that Bermuda *new potatoes* are (as usual at this season) \$12.50 to \$14.00 a barrel. Why this great price when old potatoes in some places are almost "a drug on the market?" Several years ago I went over to Bermuda to study their potato business. They get this price because of their extra-nice *new potatoes*. For 10 years or more I have been doing the same here in our Florida home. About the middle of February a grocer came to me and wanted some new potatoes. Altho they were not as yet fit to dig I gave him a few at about \$5 a bushel, and every day until now (Mar. 10) he comes right out to our garden and takes all we can scrape up, big and little, at the same price. Just now we are giving him two bushels a day, and they are sold at 60c a ½ peck almost before he can unload them. I have told you with pictures, etc., how we raise them every spring; so it seems hardly necessary to go over it again; but, as I have worked out some improvements, I will try once more to show you good people up North a little "gold mine" you can "dig out," right in your own "back yard." Right now, as your eye rests on these pages, is the time to "get busy," and to get health and "gold dollars," at one and the same time. I am testing new kinds of potatoes every winter, but so far I have found none so good as the Red Bliss Triumph. Buy northern-grown seed and cut to one eye or two eyes. Now place these pieces in a box indoors, or in a protected bed outside spaced about 4 inches apart like the cells in a honeycomb, say one in the center and six all around it. Why this bother instead of planting where they are to grow? For many

reasons; mainly, instead of planting a *potato* at the proper time you plant a "*potato plant*." Again, this group of plants generates heat, so as to stand frost, and assists rapid growth. To test it, plant some in the usual way, and compare with those in the bed when leaves first begin to show. You also get ahead of weeds. If you have only a little ground, during the first two or three weeks your crop needs but little room. We grow *two* crops every winter on the same ground inside of the six months we stay here in Florida. Keep the little bed of plants well watered, but not *too wet*. Whatever you do, find some clean rich soil so soft and loose your potatoes will never be crowded out of their natural shape by clods or sticks and stones. In Bermuda the workman claims the ground isn't in proper shape, unless he can push his naked arm down into the soil up to his elbow. We are digging potatoes now as smooth and round as an apple, some of them weighing a pound or more. Girls and women can grow Bermuda potatoes just as well as men and boys. Wesley digs and washes the potatoes, and the grocer delivers them in clean, new baskets to the good wives in such condition that all they have to do, is to dump them into boiling water. If you are cooking green peas, sort the small potatoes* and cook them *with* the peas. These new potatoes, especially if not really mature, should be cooked at once—the same day as dug, if it can be managed—to avoid having them lose their attractive appearance by being exposed too long to the light. Therefore, the grower should be careful about rushing on to the grocer more than what he will probably sell each day. More about it, with pictures, in next issue.

*Very small potatoes, boiled and mashed with wheat middlings, compose the best feed to make hens lay, that I know of.

SWEET CLOVER SEED HULLER AND SCARIFIER.

Here is a homemade scarifier that A. I. Root thinks is a good thing and suggests that it be illustrated in this department.

Dear Mr. Root:

To make a clover huller and scarifier that gives good results, cut pieces as follows: 1 board, 12 inches wide, 30 inches long; 2 pieces, 1 inch by 1½ inches, 30 inches long; 1 piece same dimensions, 9

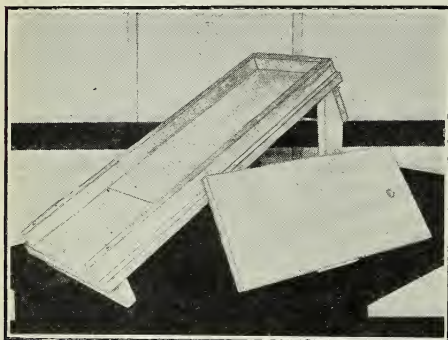


Fig. 1.—Homemade huller and scarifier. Rubber-board removed and leaning against bed in which it fits.

inches long; 2 pieces, 1 inch by 4 inches, 12 inches long.

Nail edgewise the 1 x 4-inch pieces across the 12-inch board 1 inch from ends on bottom side; next put 1½-inch strips edgewise 9 inches apart and the 9-inch strip between long ones at the top. This completes a bed for the rubber to fit in. For the rubber, use a board 20 inches long and 9 inches wide. Take a piece 1 x 4 x 9 inches long, bore a

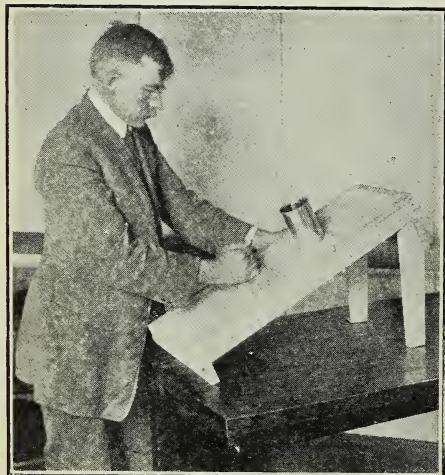


Fig. 2.—Method of using homemade huller and scarifier.

hole in center and put a piece of broom-handle 6 inches long in this hole for a handle. Nail this crossways of the rubber board 6 or 8 inches from the end. Give the rubber board a little bevel on under corner at upper end of board, to let seed feed under easier. Next put two sheets of coarse emery

cloth on the bottom of the rubber, using small tacks like those used in making plant baskets, berry crates, and window curtains; also put two sheets in the bottom-board between the strip, the top edge of the cloth being 8 inches from the end of board, tacking the cloth about 1 inch between tacks around the edges to keep the seed from working under. Tack heads should be driven down below the surface of the emery or they will soon cut out the emery cloth. Sandpaper will do if emery cannot be had, but it does not last long.

You can feed with one hand and rub with the other. Do not draw the rubber up to the end of the board, and keep a supply of seed above. By giving this huller about 30 degrees pitch, the seed will roll down and feed itself from the supply at the upper end of the bed-board.

Both wide boards should be planed and true-faced, not warped. If they are not true the cloth will soon wear out on the full spots, and the seed will slip between, unhulled. This outfit will hull 90 per cent of the seed that goes thru. If you want to make the huller a little handier, bore a ¾-inch hole in the center of the rubber board, 2½ inches from the upper end. Take a ½-gallon bucket, cut a hole in the bottom to fit the hole in the board, and then tack it to the board. By filling the bucket with seed and slightly raising the upper end of the rubber board, the seed will run out the hole from the bucket and feed between the emery cloths. Screen the seeds by using a pan-shaped flour-sifter. It has just the right mesh wire, and the unhulled can be put thru the huller again. The huller not only hulls, but scarifies the seed at the same time. By using a little energy and skill a bushel of seed can be cleaned in a day, and it is as clean as any bought from the seed store.

Ludlow, Ky., Dec. 17, 1920.

S. Rouse.

STATEMENT OF OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., OF GLEANINGS IN BEE CULTURE, PUBLISHED MONTHLY AT MEDINA, OHIO, REQUIRED BY THE ACT OF AUGUST 24, 1912.

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E. R. ROOT, Editor.
Sworn to and subscribed before me this 10th day of March, 1921. H. C. WEST, Notary Public.

PATENTS Practice in Patent Office and Court
Patent Counsel of The A. I. Root Co.
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LARGE, HARDY, PROLIFIC QUEENS

Three-band Italians and Goldens, pure mating and safe arrival guaranteed. We ship only queens that are top-notchers in size, prolificness, and color. Untested, \$2.00 each; six for \$11.00; twenty-five for \$45.00. Tested queens, \$3.00 each, six for \$16.00.

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FOR SALE—Honey in 5 and 60 pound cans.
Van Wyngarden Bros., Hebron, Ind.

FOR SALE—Choice clover-basswood blend honey in new 60-lb. cans. J. N. Harris, St. Louis, Mich.

FOR SALE—25 barrels, amber extracted honey, 12½c per pound. H. G. Quirin, Bellevue, Ohio.

FOR SALE—Choice white clover honey in 60-lb. cans—none finer. J. F. Moore, Tiffin, Ohio.

FOR SALE—Clover and buckwheat honey in 60-lb. cans. Bert Smith, Romulus, N. Y.

FOR SALE—Choice clover extracted honey. State quantity wanted. J. D. Beals, Oto, Iowa.

FOR SALE—Clover, amber, and buckwheat honey in 60-lb. cans, or 5-lb. or 10-lb. pails. C. J. Baldridge, Homestead Farm, Kendaia, N. Y.

BEST offer takes clover, basswood, and buckwheat honey, in new cans and cases.
Howard H. Choate, Romulus, N. Y.

FOR SALE—Fancy white alfalfa honey, fine for bottling; \$16.50 per case of two 60-lb. cans.
S. J. Harris, Olathe, Colo.

FOR SALE—Choice white-clover extracted honey. \$20.00 per case of two 60-lb. cans f. o. b. Holgate.
Noah Bordner, Holgate, Ohio.

FOR SALE—Well-ripened, thick and rich white-aster honey in 120-lb. cases at 15c f. o. b. Brooksville, Ky. Sample 25c. H. C. Lee, Brooksville, Ky.

FOR SALE—Clover, basswood or buckwheat honey, comb and extracted, by the case, ton, or carload. Let me supply your wants with this fine N. Y. State honey. C. B. Howard, Geneva, N. Y.

FOR SALE—A No. 1 white-clover extracted honey in 60-lb. cans, 2 cans per case. State how much you can use and I will quote on same.
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FOR SALE—White clover honey, almost water white. Put up in new 60-lb. tin cans, two to the case. Write for prices.

D. R. Townsend, Northstar, Mich.

FOR SALE—White honey in 60-lb. cans, sample and price on request. Also white clover comb, 24 sections to case. The A. I. Root Co., Inc., 23 Leonard St., New York City.

FOR SALE—10,000 lbs. A1 quality white sweet clover honey, in new 60-lb. cans. Will sell in quantities to suit. Sample free.

W. D. Achord, Fitzpatrick, Ala.

FOR SALE—Extra choice extracted white clover honey, put up in new 60-lb. cans and 5-lb. pails, Sample, 20c, same to apply on first order.

David Running, Filion, Mich.

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Walter C. Morris, 105 Hudson St., New York City.

FOR SALE—Well-ripened extracted clover honey, 20c per pound; buckwheat and dark amber, 17c, two 60-lb. cans to case. Clover in 5-lb. pails, \$1.25 per pail; buckwheat and amber, \$1.00 per pail, packed 12 pails to case, or 30 to 50 pails to barrel.
H. G. Quirin, Bellevue, Ohio.

FOR SALE—Finest quality clover extracted honey in new 60-lb. tins at greatly reduced price to close out balance of 1920 crop. Say how much you can use and we will be pleased to quote you our lowest price. Address E. D. Townsend & Sons, Northstar, Mich.

FOR SALE—Delicious raspberry-basswood-milkweed honey by parcel post or express, nicely crated. 5-lb. pail, \$1.25; 10-lb., \$2.40, and 60-lb. can, \$12.00 f. o. b. here. Honey is liquid and put up with same care as bottled goods. Write for prices of pails in quantity lots or granulated honey in 60-lb. cans. Sample 10c.

P. W. Sowinski, Bellaire, Mich.

HONEY AND WAX WANTED.

BEESWAX WANTED—For manufacture into SUPERIOR FOUNDATION. (Weed Process.)
Superior Honey Co., Ogden, Utah.

WANTED—Beeswax, also old combs and cappings to render on shares.

F. J. Rettig, Wabash, Ind.

BEESWAX wanted. Old combs (dry) and cappings for rendering. Also wax accepted in trade. Top market prices offered.

A. I. Root Co. of Iowa, Council Bluffs, Iowa.

WANTED—Extracted honey, state quantity, how packed. Send sample. Quote lowest cash price. delivered Terre Haute, Ind. W. A. Hunter, 119 So. 3rd St., Terre Haute, Ind.

WANTED—Shipments of old combs and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendered. The Fred W. Muth Co., Pearl and Walnut Sts., Cincinnati, O.

OLD COMBS WANTED—Our steam wax-presses will get every ounce of beeswax out of old combs, cappings, or slumgum. Send for our terms and our new 1921 catalog. We will buy your share of the wax for cash or will work it into foundation for you.

Dadant & Sons, Hamilton, Illinois.

WANTED—Beeswax. We are paying 1 and 2c extra for choice yellow beeswax, and in exchange for supplies we can offer a still better price. Be sure your shipment bears your name and address, so we can identify it immediately upon arrival, and make prompt remittance.

The A. I. Root Co., Medina, Ohio.

FOR SALE.

HONEY LABELS—New designs. Catalog free. Eastern Label Co., Clintonville, Conn.

FOR SALE—A full line of Root's goods at Root's prices. A. L. Healy, Mayaguez, Porto Rico.

ROOT'S goods at Root prices. A. W. Yates, 3 Chapman St., Hartford, Conn.

FOR SALE—My 8-frame power-driven extractor with honey pump. J. F. Moore, Tiffin, Ohio.

WRITE for prices on my cypress beehives and supplies. J. Tom White, Dublin, Ga.

FOR SALE—SUPERIOR FOUNDATION, "Best by Test." Let us prove it. Order now. Superior Honey Co., Ogden, Utah.

ROOT'S BEE SUPPLIES—For the Central Southwest Beekeepers. Beeswax wanted. Free catalog. Stiles Bee Supply Co., Stillwater, Okla.

PUSH-IN-THE-COMB CAGES—Quickest and safest way to introduce queens, 50c postpaid. F. R. Davis, 203 Oak St., Weehawken, N. J.

BEEKEEPERS' SUPPLIES—Root's good at factory prices. Send for 1921 catalog. F. D. Manchester, Middlebury, Vt.

FOR SALE—Root automatic 4-frame extractor. Hand and power driven. Price, \$75.00. L. F. Howden, Fillmore, N. Y.

FOR SALE—40 eight-frame hives and 130 comb-honey supers, also 120 Ideal comb-honey supers. William Davenport, 2111 Noyes St., Evanston, Ills.

FOR SALE—New metal-spaced frames. Send 5c for sample frame and new low price, also new 10-frame hive bodies. Wm. Craig, Aitkin, Minn.

FOR SALE—500 lbs. Dadant's medium brood foundation at 75c a pound in not less than 50-lb. lots. M. C. Berry Co., Hayneville, Ala.

PORTER BEE-ESCAPES save honey, time, and money. Great labor-savers. For sale by all dealers in bee supplies. R. & E. C. Porter, Lewiston, Ill.

FOR SALE or on shares, 14 apiaries, one or all. Healthful location with American school and church in town on stone road. Last crop over 40 tons. M. C. Engle, Herradura, Cuba.

FOR SALE—Good second-hand double-deck comb-honey shipping cases for $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{2}$ sections, 25c per case, f. o. b., Cincinnati. C. H. W. Weber & Co., 2146 Central Ave., Cincinnati, Ohio.

FOR SALE—One 10-inch foundation mill, $2\frac{1}{2}$ -inch rolls, practically new; can save the price of same in making 100 lbs. of foundation. Also one 6-in. mill, 2-in. rolls. W. D. Wright, Altamont, N. Y.

FOR SALE—Lot of new supplies. Lewis make, sections, foundation, hives, supers, covers, etc., at bargain prices. If interested write for complete list. C. C. Brinton, Bloomsburg, Pa.

FOR SALE—A Wisconsin honey outfit consisting of 150 colonies of bees, all necessary fixtures for extracted and comb honey, together with my home and six acres of good garden soil. Arthur Schultz, Ripon, Wis.

FOR SALE—One four-basket automatic Root honey extractor only used ten days. Reason for selling, got a power machine. E. B. Weirich, Route 10, Kalamazoo, Mich.

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FOR SALE—300 standard Langstroth drawn combs, metal-spaced and wired, in very good condition. Been used only a few years. Will sell to highest bidder. James L. Fish, Indian Lake, Box No. 53, N. Y.

FOR SALE—Good second-hand empty 60-lb. honey cans, two cans to the case, at 60c per case f. o. b. Cincinnati. Terms, cash with order. C. H. W. Weber & Co., 2146 Central Ave., Cincinnati, Ohio.

FOR SALE—500 pounds of Dadant's light brood foundation for Hoffman frames, put up in boxes holding 50 pounds net. This foundation is in the best of shape, the same as I received it. I will not accept orders for less than one box. Price, 75c per pound. M. E. Eggers, Eau Claire, Wis.

FOR SALE—Owner wants use of one of our outside warehouses, so we must move this stock. Slightly dusty and shop-worn, 1-story 8-frame hives, packages of five, \$15.00; also a new 10-frame, \$17.50. Offer good only as long as this stock lasts. A. G. Woodman Co., Grand Rapids, Mich.

FOR SALE—50 ten-frame comb-honey supers for $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{2}$ sections; 10 eight-frame for same sec. All painted. Nailed corners, not dove-tailed. Also one Manum swarm catcher, 10 queen and drone traps and 30 second-hand shipping cages for 2-lb. packages. If interested, write.

The Blue-Hive Apiaries, Preston, Iowa.

FOR SALE—75 Jumbo hives, metal and inner cover, reversible bottom, \$3.00 each, 60 extracting supers $6\frac{1}{2}$ -inch, 75c each; 20 standard bodies with drawn combs, \$1.75 each; some $4\frac{1}{4} \times 4\frac{1}{4}$ and 4×5 comb-honey supers, all 10-fr. size. All nailed and painted, guaranteed as good as any other hive, and in A-1 shape. No frames or bees.

A. H. Hattendorf, Ocheyedan, Iowa.

AM selling out. 3000 sections $4 \times 5 \times 1\frac{1}{2}$, \$11.00 per 1000, in 1000 lots or more; 1000 fences for 4×5 sections, \$4.00 per 100 in 200 lots or more. 50 shipping cases (Lewis) at 50c each, but must take the whole crate; 20 lbs. thin surplus foundation (Dittmer), 80c per lb., in 10-lb. lots or more. All goods are new, just as I bought them. \$110 takes the whole lot. Order quick. Fred A. Krause, Ridgeland, R. D. No 1, Wisc.

FOR SALE—T supers made for me on special order by A. I. Root Co. Regular dove-tailed hive, $\frac{1}{2}$ -body size, except sides are $\frac{3}{8}$ instead of $\frac{7}{8}$, making super $\frac{1}{2}$ inch wider inside. 3 T tins, 4 L tins, 2 side and 2 end followers, 5 separators to each super for $4\frac{1}{4}$ -inch sections, 100 left in flat. \$100 takes the lot. Honey flow too scant here for section honey, only two full and one-half crop in 12 years. Might take some white extracted honey on a deal. S. S. Lawing, Ozark, R. D. No. 4, Mo.

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AUTOMOBILE owners should subscribe for the **AUTOMOBILE DEALER AND REPAIRER**; 150-page illustrated monthly devoted exclusively to the care and repair of the car. The only magazine in the world devoted to the practical side of motoring. The "Trouble Department" contains five pages of numbered questions each month from car owners and repairmen which are answered by experts on gasoline engine repairs. \$1.50 per year. 15 cents per copy. Postals not answered. Charles D. Sherman, 107 Highland Court, Hartford, Conn.

WANTS AND EXCHANGES.

WANTED—Second-hand honey storage tank of galvanized steel. H. L. Sherwood, Cornwall, N. Y.

INCUBATORS— $\frac{1}{4}$ price, exchange for extractor, double gun repeater. Lorenzo Clark, Winona, Minn.

WANTED—Full colonies of bees or nuclei. Henry Roorda, 10741 Lafayette Ave., Chicago, Ills.

WANTED—A second-hand four-frame automatic extractor. A. V. Pracher, Willow River, Minn.

WANTED—50 colonies of bees, free from disease. J. R. Simmons, 15540 Turlington Ave., Harvey, Ills.

WANTED—Disease-free bees, beehives, supers, tops, and bottoms. What have you? Lloyd W. Smith, Madison, N. J.

WANTED—Old combs and cappings for rendering on shares. Our steam equipment secures all the wax. Superior Honey Co, Ogden, Utah.

WANTED—To quote special prices on queen cages in quantity lots, to breeders. State quantity wanted. A. G. Woodman Co., Grand Rapids, Mich.

WANTED—To lease bees on shares with option of buying in Pacific Northwest. E. T. Israel, College Station, Pullman, Wash.

WANTED TO BUY from one to fifty stands of bees. State all in first letter. Parties within radius of 200 miles will have preference. Chas. A. Fisher, Savoy, Ills.

WANTED—200 or less colonies of bees for spring delivery. Any style hive or box. Remembering 10c honey is in sight for 1921. A. W. Smith, Birmingham, Mich.

WANTED—200 or more colonies of bees within 100 miles of Flint to work on shares for extracted honey, for season 1921. Address Leonard S. Griggs, 711 Avon St., Flint, Mich.

WANTED—Second-hand honey-extractor, 12-in. pockets; also quantity of ten-frame brood-chambers. All must be in good condition. Levi Kinney, Ithaca, Mich.

WANTED—To sell or exchange for beekeeping supplies, one set of the Encyclopedia Britannica, genuine India paper, as good as new. Joe Gates, Hazen, R. D. No. 4, Ark.

WANTED—To correspond with fruit and vine grower having bees that will lease them on shares or go in partnership with me for carload honey production, with very small expenses. M. Hoffman, 69 Center St., Wyandotte, Mich.

BEES WANTED ON SHARES—100 to 200 colonies in southeastern Michigan for season of 1921. Years of experience, County Apiary Inspector. Now own 180 colonies. Earl F. Townsend, 417 Gillespie Ave., Flint, Mich.

WANTED—To exchange a 4 x 5-inch "Premo" film-pack camera and accessories, good as new, for new or used Root "Buckeye" hives in good condition and free from disease. If camera does not appeal to you state spot-cash price on what you have. James Cockburn, Wellsboro, Pa.

FOR SALE—14 hives of bees, 8-frame, some divisible, mostly new, painted, \$10.00 per hive at apiary. Shallow extracting and comb-honey supers, extractor, frames, cheap. Mrs. L. Mueller, Maple-dale Farm, Westwood, N. J.

MISCELLANEOUS

SEE our large advertisement on page 243. N. O. Fuller, Medina, O.

FREE sample annual white blossom sweet clover, scarified. Send 2c stamp for postage. Jas. H. Kitchen, Springfield, R. D. No. 5, Ohio.

FOR SALE—Carneaux pigeons, 50 pairs red and yellow, fine birds, \$2.00 a pair. W. E. Genthner, Saugerties, N. Y.

MAPLE SYRUP—I am now booking orders for pure maple syrup to be delivered in April. Order early. Satisfaction guaranteed. G. E. Williams, Somerset, R. D. No. 4, Pa.

STRAWBERRY PLANTS—Improved Senator Dunlap, best of all strawberries. Prices on application. McAdams Seed Co., Columbus Grove, Ohio.

FOR SALE—Annual white sweet clover seed from clover 10 to 12 feet high. California grown. Got 111 lbs. left, \$5.00 per lb. f. o. b. None better on market, and 3120 lbs. of Willow Celery and alfalfa honey at 15c per lb. in 60-lb. cans, 2 to a case. O. J. Arfsten, Locke, Calif.

BEES AND QUEENS.

FINEST Italian queens. Send for booklet and price list. Jay Smith, R. D. No. 3, Vincennes, Ind.

WHEN it's GOLDEN, it's PHELPS. C. W. Phelps & Son, Binghamton, N. Y.

FOR SALE—Italian queens and nuclei. B. F. Kindig, E. Lansing, Mich.

HARDY Italian queens, \$1.00 each. W. G. Lauver, Middletown, Pa.

GOLDEN Italian queens, untested, \$1.50 each; dozen, \$14.00. E. A. Simmons, Greenville, Ala.

FOR SALE—1921 Golden Italian queens, price list free. Write E. E. Lawrence, Doniphaun, Mo.

FOR SALE—Bright Italian queens, \$1.50 each; \$14.00 per doz. Ready after April 15. T. J. Talley, Greenville, R. D. No. 3, Ala.

NOTICE—We have booked orders for all the bees we will sell this season. Jones & Stevenson, Akers, La.

FOR SALE—1 or 50 colonies of bees in 10-frame Hoffman hives, inspected, \$20.00 each, April and May delivery. S. K. Blundin, Oxford Valley, Pa.

FOR SALE—Golden or three-banded virgins, 60c each, or \$6.00 per dozen. Safe arrival. R. O. Cox, Luverne, Ala., R. D. No. 4.

BEES AND QUEENS from my Carolina apiaries—progeny of my famous Porto Rican pedigreed-breeding stock. Elton Warner, Asheville, N. C.

PACKAGE BEES and PURE ITALIAN QUEENS. Booking orders now for spring delivery. Circular free. J. E. Wing, 155 Schiele Ave., San Jose, Calif.

FOR SALE—Leather-colored Italian queens, tested, until June 1, \$2.50; after, \$2.00; untested, \$1.25; 12, \$13.00. Root's goods at Root's prices. A. W. Yates, 15 Chapman St., Hartford, Conn.

Business-First queens, untested, \$1.50 each; select untested, \$1.75; tested, \$2.25; select tested, \$2.50. Safe delivery guaranteed, orders filled promptly. M. F. Perry, Bradentown, Fla.

FOR SALE—A. I. Root Co. strain of leather-colored Italians. Virgins only, May to October 1, 75c; 10, \$7.00; 100, \$65.00. P. W. Stowell, Otsego, Mich.

BEES BY THE POUND — Also QUEENS. Booking orders now. FREE circulars give details. See larger ad elsewhere. Nueces County Apiaries, Calallen, Texas. E. B. Ault, Prop.

ORDER booked now for delivery June 1, 3-frame nuclei and queen, \$7.50; select tested, \$8.50. Dr. Miller's strain. No pound packages. Low express rates and quick transit to north. S. G. Crocker, Jr., Roland Park, Baltimore, Md.

THREE-BAND AND GOLDEN QUEENS, that produce hustling bees, bred to fill the supers from the finest breeding strains obtainable. Hustlers long-lived and as beautiful in size and color as can be. Price, untested, \$1.75; tested, \$3.00. Orders filled promptly. Satisfaction guaranteed. Ask for price on large orders. Dr. White Bee Co., Sandia, Texas.

PHELPS' GOLDEN QUEENS will please you. Mated, \$2.00. C. W. Phelps & Son, Binghamton, N. Y.

FOR SALE—50 colonies of Italian bees in eight-frame hives. No disease, \$6.00 per colony. Dr. Hugh LeJambre, Bordentown, N. J.

THAGARD'S ITALIAN QUEENS produce workers that fill the supers quick. V. R. Thagard, Greenville, Ala.

FOR SALE—Farm and 50 colonies of bees with equipment for 100 or more. Good location. A. L. Weidler, McBain, Mich.

FOR SALE—By Chicago beekeeper, three colonies with supers and other fixtures. Inquire The A. I. Root Co., 230 W. Huron St., Chicago, Ills.

FOR SALE—Hardy Northern-bred Italian queens and bees. Each and every queen warranted satisfactory. For prices and further information, write. H. G. Quirin, Bellevue, Ohio.

FOR SALE—15 colonies of Italian bees of 10 frames, frames wired and combs built from full sheets of foundation. No disease. H. Shaffer, 2860 Harrison Ave., Cincinnati, Ohio.

FOR SALE—Three-banded Italian queens, untested, \$1.50 each; 6, \$7.50; 12, \$14.00. Select untested, \$1.75 each. Satisfaction guaranteed. W. T. Perdue & Sons, R. D. No. 1, Fort Deposit, Ala.

FOR SALE—Three-banded Italian queens, untested, \$1.25; tested, \$2.00. Ready June 1. Satisfaction guaranteed. Chas. W. Zweily, Willow Springs, Ills.

BY return mail, tested Italian queens, three-banded strain. Only one grade—the best. Safe arrival, satisfaction, and no disease guaranteed. J. W. K. Shaw & Co., Loreauville, La.

FOR SALE—Golden queens, untested, \$1.15; 6 or more, \$1.10 each; select untested, \$1.60; 6 or more, \$1.50 each. Safe arrival. Hazel V. Bonkemeyer, Randleman, R. D. No. 2, N. C.

FOR SALE—Bees for May and June shipment. Two pounds bees and an untested Italian queen shipped by express on drawn comb with stores. Certificate of health with each shipment. Ross B. Scott, LaGrange, Ind.

STUTT'S Italian queens are supreme queens; ready June 1. Untested, \$1.25; 6, \$6.50; 12, \$12.50. Select untested, \$1.50; 6, \$8.00; 12, \$15.00. Pure mating and safe arrival guaranteed. Alfred A. Stutt, Lincoln, Ills.

WE believe we have the best Italian queens obtainable. Our new system is working wonders. Book your order now for 1921. Untested, \$1.50; tested, \$3.00; virgins, imported mothers, 50c. F. M. Russell, Roxbury, Ohio.

WE are now booking orders for early spring delivery of two and three frame nuclei, with untested or tested queens. Write for prices and terms. We also manufacture cypress hives and frames. Sarasota Bee Co., Sarasota, Fla.

ITALIAN QUEENS OF WINDMERE are superior three-banded stock. Untested, \$1.50 each; 6 for \$8.00; tested, \$2.50 each; select tested, \$3.00. Bees by the pound. Write for prices. Prof. W. A. Matheny, Ohio University, Athens, O.

DAY-OLD ITALIAN QUEENS—High quality, low price, satisfied customers. Safe arrival guaranteed in U. S. and Canada. Safe introduction. Prices: 1, 75c; 12, \$7.20; 100, \$60. Write for circular early. James McKee, Riverside, Calif.

1921 price of bees and queens from the A. I. Root Co. leather-colored stock 1 lb. bees with queen, \$5.00; 2 lbs. \$7.50. Untested queens, \$1.50 each; dozen, \$15.00. Safe arrival. Orders booked now. Greenville Bee Co., Greenville, Ala.

IF YOU want queens that will produce results, give **THAGARD'S ITALIAN QUEENS** a trial. V. R. Thagard, Greenville, Ala.

MY famous leather-colored Italian queens for May delivery, \$2.00 each or six for \$11.00. J. W. Romberger, Apiarian, 3113 Locust St., St. Joseph, Mo.

BEEES BY THE POUND, also pure-bred **QUEENS**; booking orders now for delivery after March 15th. Everything guaranteed. Brazos Valley Apiaries, Gause, Texas.

PACKAGE BEES—Two-pound blacks and hybrids, \$4.25. Will guarantee 75 per cent safe arrival. Can begin shipping about May 10. One-fourth cash with order. Can supply queens from breeder. J. M. Berrier, Grandview, Texas.

FOR SALE—30 colonies of bees in 10-frame hives, spaced 9 frames to the hive, shipment to be made about June 1 after they are unpacked. Also write for prices on what you may want in bee supplies. F. J. Rettig, Wabash, Ind.

FOR SALE—2-lb. packages Italian bees and queens by parcel post, postage paid, delivery April 15, for \$8.50; 2-frame nuclei with Italian queen by express, not prepaid, delivery May 5, \$9.00. Otto J. Spahn, Pleasantville, N. Y.

IF good three-banded Italian queens are wanted, send your order to M. Bates & Sons, Greenville, R. D. No. 4, Ala. One dozen queens, \$14.00; 100, \$100. Pure mating, safe arrival, and satisfaction guaranteed.

QUEENS—THE FAMOUS BRENNER strain of three-banded Italians. Equalled only by the best. Untested, \$1.50 each; \$15.00 per dozen. Tested, \$2.50 each. Satisfaction guaranteed. Dr. A. Wright, Kingsbury, Texas.

FOR SALE—Root's strain of golden and leather-colored Italian queens, bees by the pound and nuclei. Untested, \$1.50 each; select untested, \$2.00; tested, \$2.50 each; select tested, \$3.00. For larger lots write. Circular free. A. J. Pinard, 440 N. 6th St., San Jose, Calif.

SHE-SUITS-ME queens, season of 1921. Untested Italians, \$2.00 each, 10 or more, \$1.75 each. From May 15 to June 15. After June 15, \$1.50 each, up to nine queens; 10 to 24 queens, \$1.40 each; 25 and up, \$1.25 each. Allen Latham, Norwichtown, Conn.

FOR SALE—Three-band Italian bees and queens, ready June 1. Fine stock, free from disease and guaranteed to please you. (One grade) select untested queens, \$1.50 each; 6, \$8.00; 12, \$15.00; 50, \$60.00. Nuclei, \$3.00 per frame. Hoffman, bees, \$3.00 per pound. A. E. Crandall, Berlin, Conn.

PHELPS' GOLDEN ITALIAN QUEENS combine the qualities you want. They are **GREAT HONEY-GATHERERS, BEAUTIFUL** and **GENTLE**. Virgins, \$1.00; mated, \$2.00; tested, \$5.00. Breeders, \$10 to \$20. Safe arrival guaranteed only in the U. S. and Canada. C. W. Phelps & Son, Binghamton, N. Y.

TWO-FRAME NUCLEI with untested Italian queens from the apiary of E. R. King, formerly inspector in Ohio and later in charge of Apiculture at Cornell University. No disease in territory. May delivery, \$7.50; June, \$6.50; July, \$5.00. 50 per cent cash with order. If queen is not wanted, deduct \$1.25 from above prices. Miss E. J. King, McArthur, Ohio.

FOR SALE—Honey-Brook Farm can supply you promptly, beginning April 10, with the very best three-banded Italian queens, one grade, select untested, \$1.50 each, or \$15 per dozen; tested, \$2.00 each straight; ready April 1. Should you find some queenless colonies this spring, send me your order for a young queen to save them. I will not disappoint you. I have the bees and can deliver the goods. Pure mating, safe arrival, and satisfaction guaranteed. Jasper Knight, Hayneville, Ala.

BEEES from my Italian queens would not excel at an exhibit, but they are hard to beat any place else. Circular tells more about them. R. V. Stearns, Brady, Texas.

ITALIAN QUEENS—We will have a limited number of our "Riverside" queens for sale this season. These are the product of years of skillful breeding. Write for prices.

Riverside Apiaries, Caryville, Fla.

"QUEENS, QUALITY FIRST QUEENS." High-grade, pure, three-banded and golden Italians. These queens are as good as can be bought; are gentle, prolific, and good honey-gatherers. I guarantee safe arrival and satisfaction. Why not try these and be convinced? Untested, \$1.25 each; 6, \$6.50; 12, \$12.50. Selected untested, \$1.50; 6, \$8.00.

G. H. Merrill, Pickens, S. C.

"BEEES, APRIL SHIPMENT," 15th to May 1st. Two pounds bees on a standard frame with brood and honey, \$4.75; three pounds, \$6.15. No disease and safe arrival guaranteed. Orders booked in rotation. Please order from advertisement. Address with remittance. No queens shipped with April bees.

L. C. Mayeux, Box 4, Hamburg, La.

FOR SALE—Pure Italian queens, Golden or leather-colored, packages and nuclei; 1 untested queen, \$1.50; 6, \$7.50; 12, \$13.50; 50, \$55.00; 100, \$100; virgins, 50c each; packages 24 and under, \$2.25 per pound; 25 and over, \$2.00 per pound; nuclei, 1-frame, \$4.00; 2-frame, \$6.00; 3-frame, \$7.50; queens extra. One-story 10-frame colony with queens, \$12.00. Golden Star Apiaries, R. 3, Box 166, Chico, Calif.

FOR SPRING DELIVERY—One good Italian queen, 1 Hoffman standard frame emerging brood, 1 pound live bees, price complete, \$6.50, f. o. b. Bordelonville. Queen introduced, mated, laying en route; loss in transit replaced if noted on express tag by agent; no disease in State. References given. Orders booked, May delivery, one-fifth cash; orders filled in rotation. Jess Dalton, Bordelonville, La.

FOR SALE—30 colonies of bees in 3-frame brood-chamber and 6 frames in supers 4¼ x 4¼. Langstroth hives, pine, dovetailed. Will pack and deliver to express company in Shawneetown and guarantee to destination, for \$6.00 per colony. Will ship from 1st to 15th May. The bees are in Shawneetown, Ills. Will not sell less than 5-colony lots. Address me up to May 1, Fort Lauderdale, Fla.

R. Cadle, Fort Lauderdale, Fla.

QUEENS—Three-banded Italians only. Now that the booking season for nuclei has passed, and, while I have a large number of orders for nuclei, I shall not be too busy with these to fill your orders for queens. 1 untested for April, \$1.25; 12, \$12.50; 1 untested for May 1 to June 1, \$1.00; 12, \$10.00. I ship no queens after June 1; weather is too hot. Discount on large orders. Safe arrival guaranteed.

L. R. Dockery, Carrizo Springs, Texas.

FOR SALE—1921 prices on nuclei and queens, 1-frame nucleus, \$3.00; 2-frame nucleus, \$5.00; 3-frame nucleus, \$6.50, without queens, f. o. b. Macon, Miss. 5 per cent discount in lots of 25 or more. Untested queens, \$1.50 each; \$15.00 per dozen; tested, \$2.00 each; \$22.00 per dozen. No disease. Inspection certificate with each shipment. Safe arrival and satisfaction guaranteed in U. S. Queens sold only with nuclei.

Geo. A. Hummer & Sons., Prairie Point, Miss.

We want to please you; our reliable three-banded queens and bees will be ready May 1. All bees are shipped on a standard frame of brood and honey. 1-lb. package bees, no queen, \$3.25; 2-lb., \$4.50; 3-lb., \$5.75. One-frame nuclei, no queen, \$2.75; 2-frame, \$4.00. Queens untested, each, \$1.50. A few hybrid bees from outyards; but remember, all queens are reared from our home queen yard. Safe delivery guaranteed; also free from disease of any kind; 25 per cent with order, balance 10 days before shipping date. A few selected tested queens at \$2.50 each. Oscar Mayeux, Lock Box No. 15, Hamburg, Louisiana.

FOR SALE—Pure Italian queens and nuclei, 1 untested queen, \$1.50; 12, \$15.00; tested queens, \$2.50 each; 2-frame nucleus, \$5.00; 3-frame nucleus, \$6.50. Add price of queen wanted to price of nucleus.

Frank Bornhoffer, R. D. No. 17, Mt. Washington, O.

FOR SALE—Three-band leather-colored Italian bees and queens, two-pound packages only. Shipping season, April 15 to May 25. Safe arrival and satisfaction guaranteed. No disease. Two-pound package, \$5.00; untested queen, \$1.50; select untested, \$2.00; tested, \$2.50; select tested, \$3.00. Circular on request. J. M. Cutts, R. No. 1, Montgomery, Ala.

ITALIAN BEES for May delivery. Safe delivery and no disease guaranteed. We want to please you. Bees shipped on comb of stores in Standard Hoffman frame. 3-lb. pkgs. with untested queen, \$7.00; 3-lb. pkgs. with tested queen, \$8.00; two-frame nuclei with untested queen, \$6.50; three-frame nuclei with untested queen, \$8.00. 50 per cent books your order. Balance 30 days before date of shipment. J. L. St. Romain, White Clover Farm and Apiary, Hamburg, La.

IF you think **PHELPS' GOLDEN QUEENS** are BEAUTIFUL, GENTLE, and just what you want to IMPROVE YOUR STOCK, we will do our best to supply you if you will give us time to fill your order in its turn. Mated (untested), \$2.00 each; virgins, \$1.00 each; tested, \$5.00 each; select breeders, \$10.00 to \$20.00 each. We will commence sending queens just as early as weather will permit us to rear good ones. C. W. Phelps & Son, 3 Wilcox St., Binghamton, N. Y.

PRITCHARD QUEENS (Three-banded Italians) —My first season selling direct to the trade. June price: 1 untested, \$1.75; 6 for \$9.50; 1 select untested, \$2.00; 6 for \$11.00. After July 1: 1 untested, \$1.50; 6 for \$8.00; 1 select untested, \$1.75; 6 for \$9.50. Write for prices on larger quantities. I have a few extra-select tested queens one year old at \$5.00 each. Queens clipped free of charge on request. Acknowledgment and directions for introducing sent on receipt of order. Safe delivery and satisfaction guaranteed. Let me book your order now for early delivery, specifying the date of shipment desired. Otherwise orders will be filled in rotation. Arlie Pritchard, Medina, Ohio.

HELP WANTED.

WANTED—A reliable man with some beekeeping experience to help in my bee business. Begin work about April 15. H. B. Gable, Romulus, N. Y.

WANTED—Young man of good habits, to work with bees, some experience necessary. Room and board furnished. State all particulars in first letter. B. B. Coggsall, Groton, N. Y.

WANTED for the season of 1921 an experienced queen-breeder. State experience had, reference, age, height, weight.

W. J. Forehand & Sons, Ft. Deposit, Ala.

WANTED—A willing and reliable young man of good habits to help in our 13 apiaries and apple orchard. State age, weight, height, and wages expected in first letter. We have 700 colonies. A good chance to learn commercial beekeeping.

Harry W. Beaver, Troy, Pa.

WANTED—One experienced man, and students or helpers, in our large bee business; good chance to learn. Modern equipment and outfit, including auto truck; located near summer resorts. Write, giving age, height, weight, experience, reference, and wages wanted. W. A. Latshaw Co., Clarion, Mich.

WANTED—Two young men, able-bodied, willing to work, clean in body and mind, who want to learn beekeeping and are willing to exchange faithful services for instruction from a man with almost 40 years of extensive experience in beekeeping, board and some financial remuneration. Have 12 apiaries. R. F. Holtermann, Brantford, Ont., Can.

WANTED—One experienced man and students. clean habits, able-bodied and willing workers, as helpers with our more than 1000 colonies. Opportunity to learn the business from A to Z, 1920 crop 122,000 pounds. Theory also. Write immediately, giving age, height, weight, habits, former employment, experience, references, wages, photo, all in first letter. E. F. Atwater (former Special Field Agent in Beekeeping, U. S. Dept. Agr.), Meridian, Idaho.

SITUATIONS WANTED

WANTED—A chance to learn beekeeping in a modern apiary in Minnesota

L. A. Tessmer, Rockford, Minn.

WANTED—Work in a bee yard as helper. State what wages will be paid.

C. Prescher, 143 Bowery St., New York, N. Y.

YOUNG man with experience in fruit growing with beekeeping as side line, wants position in modern apiary to learn business. Small salary would be satisfactory while learning.

Hubert R. West, Albion, Nebr.



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Positively the cheapest and strongest light on earth. Used in every country on the globe. Makes and burns its own gas. Casts no shadows. Clean and odorless. Absolutely safe. Over 200 styles. 100 to 2000 Candle Power. Fully Guaranteed. Write for catalog. AGENTS WANTED EVERYWHERE.

THE BEST LIGHT CO.
306 E. 5th St., Canton, O.

Cheapest Way to Go

to work, to school, or for fun and recreation is on a **Ranger Bicycle**. Choice of **44 Styles**, colors and sizes. Save \$10 to \$25 on Direct From-the-Factory shipment. **30 Days Free Trial**, shipped on approval. We pay the express both ways if not accepted. **12 Months to Pay** on installments. Saved time and carfare easily meets the small monthly payments.

Tires—Parts equipment—half usual retail prices. Send no money. Write for big, illustrated **free Ranger Catalog**. Prices and Payment Terms.

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Strawberries and all Small Fruit Plants mean big and quick profits for you at small outlay of money. We are headquarters for Summer and Fall Bearing

Strawberry Plants, Raspberries, Blackberries, Gooseberries, Currants, Grapes, Fruit Trees, Roses, Shrubs, Eggs for Hatching, Crates, Baskets, Seed Potatoes, Asparagus, etc. Best varieties, lowest price, 38 years' experience.

Our free catalogue is brimfull of valuable information. Be sure to send for it. Write today.

L. J. Farmer, Box 108, Pulaski, New York




World's Best Roofing at Factory Prices

"Reo" Cluster Metal Shingles, V-Crimp, Corrugated, Standing Seam, Painted or Galvanized Roofings, Siding, Wallboard, Paints, etc., direct to you at Rock-Bottom Factory Prices. Positively greatest offer ever made.

Edwards "Reo" Metal Shingles
cost less; outlast three ordinary roofs. No painting or repairs. Guaranteed rot, fire, rust, lightning proof.

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Get our wonderfully low prices and free samples. We sell direct to you and save you all in-between dealer's profits. Ask for Book No. 183



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—NONE BETTER—50 years selling seeds. Prices below all others. Buy and test. If not O. K. return and I will refund. Extra packets sent free in all orders I fill. Send address for **BIG CATALOGUE**, illustrated with over 700 pictures of vegetables and flowers of every variety.

R. H. SHUMWAY,
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Raise Guinea PIGS FOR US!

We need men and women, boys and girls everywhere to raise Guinea Pigs for us. We tell you where to get them, show you how and buy all you raise. Big opportunity for money making. Thousands needed weekly.

Easy to Raise—Big Demand No special knowledge, experience or equipment needed. **Large Profits** They breed the year round—are very prolific—require but little space or attention. Pay better than poultry or squabs—cost less to house, feed, keep, easier raised—less trouble, market guaranteed. Particulars, contract, and booklet how to raise **FREE** **CAVIES DISTRIBUTING COMPANY** 3145 Grand Avenue, Kansas City, Mo. Largest Guinea Pig breeders and distributors in America.

QUEENS

Gentle three-band Italians. Untested \$1.25. Select untested \$1.50. Send your order now for April and May delivery. Your honey crop depends on good queens. I guarantee mating and quality.

D. W. HOWELL
Shellman, Georgia

Our Food Page.—Continued from Page 221

way, can remember when there was no town on this site. He came here with his father exactly 70 years ago, and his reminiscences were very interesting.

The following menu gives little idea of the luncheon, which was perfectly cooked and served:

MENU.

Relish

Queen Olives

Soup

Light Amber Extracted in Alexander Feeders

Fish

Three-banded Striped Bass

Meat

Chicken, Select Tested

Dessert

Apple Pie, Bevel Cover

Coffee

Dark Amber

Cheese

American European

Singing by Queens, Workers, and Drones.

The San Francisco and Oakland papers gave much space to reports of the meetings. In the Sunday San Francisco Chronicle appeared a cartoon of the Oakland City Hall, with a swarm of bees approaching and hovering around it, said bees on close inspection proving to be winged men carrying traveling bags. On one side of the tower was "It was Honey Week," and on the other side, "California State Beekeepers' Association swarmed into Oakland—no record of anyone getting stung."

Extracted Honey We Sell It!

Write for Prices

C. C. Clemons Produce Co.

132 Grand Avenue
KANSAS CITY, MISSOURI



Queens

Write for our catalog of high-grade Italian Queens. Pure mating and safe arrival guaranteed.

Prices for 1921.

1 to 4 inclusive \$3.00 ea.
5 to 9 inclusive 2.90 ea.
10 or more... 2.80 ea.
Breeders 12.00 ea.

Jay Smith

Route Three
Vincennes, Indiana.

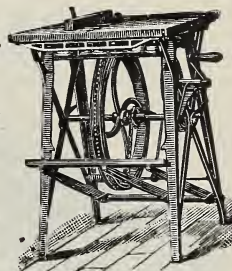
BARNES' Hand and Foot Power Machinery

This cut represents our combined circular saw, which is made for beekeepers' use in the construction of their hives, sections, etc.

Machines on Trial

Send for illustrated catalog and prices.

W. F. & JOHN BARNES CO
545 Ruby Street
ROCKFORD, ILLINOIS



EVERBEARING STRAWBERRIES

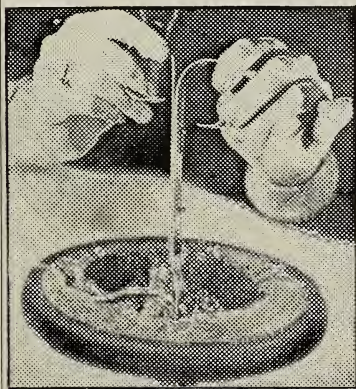
Our selection best varieties for home and market—100 plants postpaid, \$2.50; 200 \$4.25; 300 \$6.00.

Home of the Everbears.

Introducers of Progressive.

Best up-to-date standard varieties (not everbearing, our selection). 100 plants postpaid, \$1.25; 200 \$2.10; 300 \$2.95. Catalog free.

C. N. Flansburgh & Son - Jackson, Mich.



"For Lovers of Art Needle Work" The Wonder Embroidery Needle

*It is easy to embroider the AUTOBROIDER W.J.V.
So simple a Child Can Operate It.*

THIS WONDERFUL NEW INVENTION enables you to do the most beautiful hand embroidery in very short time, and so easily that no skill is needed.

Makes all stitches alike and is self-feeding. You can embroider Dresses, Scarfs, Pillow Tops, Center Pieces, Children's Clothes, in fact, everything that should be embroidered.

Ten times as fast and at half the cost of the old way. You can also make beautiful velvet-effect rugs. The most "HUMAN NEEDLE" ever produced to be worked by hand.

Price of Needle complete with instructions, skein of yarn, pillow top and back for \$1.50 prepaid.

Send Money Order, Check, or Currency in place of stamps when possible.

N. O. FULLER

MEDINA, OHIO

Buy Your Bee Supplies Now

Take advantage of early-order discounts by ordering NOW. We guarantee to please you. "Prompt service and the very best" is our motto. *We want your beeswax and old comb.* Highest cash and trade prices offered. Texas beekeepers should write A. M. HUNT, Goldthwaite, Texas.

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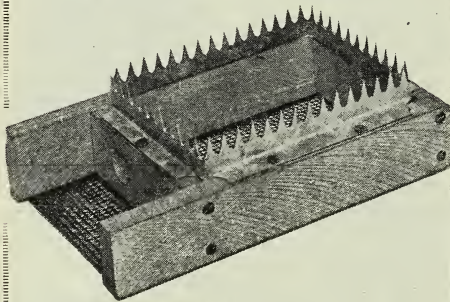
Leahy Manufacturing Company

95 Sixth St., Higginsville, Missouri.

Write for FREE catalog. It is to your interest.

Stop Losing Valuable Queens!

This can be done by the use of the Jay Smith Push-in-the-Comb introducing cage. This cage has been thoroughly tested, and will give very satisfactory results. For complete information on



this cage, see pages 498 to 500, August, 1919, "Gleanings in Bee Culture." Price complete, 75 cents each; ten, \$7.00; one hundred, \$60.00.

The A. I. Root Company
West Side Station
MEDINA OHIO

LEWIS 4-WAY BEE ESCAPES



Four exits from supers. Fits all standard boards. Springs of coppered steel. Made of substantial metal. Made by

G. B. Lewis Company, Watertown, Wis., U.S.A.

Sold only by Lewis "Beeware" Distributors.

Established 1885.

Write us for catalog.



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The Kind You Want and the Kind That Bees Need.

We have a good assortment in stock of bee supplies that are mostly needed in every apiary. The A. I. Root Co.'s brand. Let us hear from you; information given to all inquiries. Beeswax wanted for supplies or cash.

John Nebel & Son Supply Co.
High Hill, Montgomery Co., Mo.

SPECIAL CROPS

\$10,000.00 per acre every 5 years.

A high grade monthly devoted to growing MEDICINAL plants. \$1.00 per year, sample copy ten cents.

HYBRID POTATO SEED. Something new. Every seed will give you new variety of potato. You will get all shapes and all colors. Some better than old standard sorts and some not as good. Package of this seed 25 cts. Potato seed and new subscription both for \$1.00. Address

SPECIAL CROPS PUB. CO.
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is of your own making rather than of your taking. Your Savings Account may—WILL—be the making of your chance. MAIL your Savings deposits to this institution.

THE SAVINGS DEPOSIT BANK CO.

A.T. SPITZER, Pres.

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MEDINA, OHIO

FOR SALE

Three-banded Italian Bees and Queens after April 15th. 1 12

Untested Queens\$1.75 \$15.00

Select Untested Queens.... 2.25 20.00

Tested Queens 2.75 28.00

Select Tested Queens..... 3.25 33.00

Breeders \$5.00 to \$10.00 at all times.

A limited amount of one and two frame Nuclei. Prices on request.

H. L. MURRY

SO, MISS.

NEWMAN'S Bred From the Best. Absolutely First Quality ITALIAN QUEENS

and fully guaranteed. No disease. Satisfaction and safe arrival.

Untested, \$1.50; 6, \$8.00;

12, \$15.00. Select Un-

tested, \$2.00; 6, \$10.00.

12, \$19.00. Circular free.

A. H. NEWMAN, Queen Breeder

MORGAN, KY.

QUEENS and BEES WHEN YOU WANT THEM

We are establishing one of the most modern Queen-rearing outfits in the United States, and will breed from New Imported Italian Blood. We are not going to tell you how many Queens we will put on the market, as we shall produce **QUALITY** instead of **QUANTITY**.

A limited number of orders for spring delivery will be accepted at the following prices:

Quantity	1	6	12	24
Untested ..	\$2.00	\$11.40	\$21.60	\$40.80
Sel. Untested ..	2.25	12.80	24.30	45.90

We are also prepared to furnish full colonies, nuclei, and pound packages for spring delivery. Write today for prices.

**THE A. I. ROOT COMPANY
OF TEXAS**

P. O. Box 765, SAN ANTONIO, TEX.

Pure Italian Queens of the Best Known Strain

Booking orders now for spring delivery of two-frame nuclei, two-pound packages and full colonies. **A. I. Root and H. D. Murry** three-banded stock

Prices:	1	12
Untested	\$1.50	\$14.50
Tested	2.25	24.00
Select Tested..	3.00	30.00

Two-frame nuclei with untested queens, \$6.00; twenty-five or more, \$5.50. Two-frame nuclei with tested queens, \$6.75; twenty-five or more, \$6.25. Two-pound packages hybrid bees, each \$4.00; add price of queens wanted.

No disease near here; health certificate with all I have for sale. Safe arrival and satisfaction guaranteed. Terms: One-fourth with order; balance due at shipping time.

Baughn Stone

Manchester, Texas.



THE OLD RELIABLE THREE-BANDED ITALIANS



Booking orders now for 1921. Queens ready April 1st. My Italians are of an exceptionally vigorous and long-lived stock strain of bees. They are gentle, prolific, very resistant to foul brood, and the best of honey-gatherers. I have sold a good many queens to parties who are using them in stamping out foul brood. Orders booked for one-fourth cash, balance before delivery. Will guarantee safe arrival in the United States and Canada. Descriptive circular and price list free.

Prices April, May, and June			July to November			
	1	6	12	1	6	12
Untested	\$1.50	\$8.00	\$15.00	\$1.25	\$6.50	\$12.50
Select Untested	1.75	9.00	16.00	1.50	8.00	15.00
Tested	2.50	12.50	24.00	2.25	12.00	22.00
Select Tested	3.00	3.00 each		3.00 each		

No nuclei or pound packages of bees for sale.

John G. Miller, 723 C St., Corpus Christi, Tex.

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Today



FARM WAGONS

High or low wheels—steel or wood—wide or narrow tires. Steel or wood wheels to fit any running gear. Wagon parts of all kinds. Write today for free catalog illustrated in colors.

ELECTRIC WHEEL CO., 23 Elm Street, Quincy, Ill.



TINS AND GLASS JARS

Down in Cost—Order Now for Next Crop Packing.
Note Low Prices Subject to Change at Any Date.

2 1/2-lb. Cans.	
2 dozen reshipping cases.....	\$1.45 per case net
In 100-can crates.....	\$6.50 per crate net
In 200-can crates.....	\$11.00 per crate net
In 500-can crates.....	\$24.50 per crate net
5-lb. Pails with Handles:	
1 Doz. reshp. cases.....	\$1.35 per case net
In Crates of 100.....	\$8.30 per crate net
In Crates of 200.....	\$16.25 per crate net

10-lb. Pails with Handles.	
In 1/2 Doz. cases.....	\$1.10 per case net
In crates of 50.....	\$6.70 per crate net
In crates of 100.....	\$12.75 per crate net
5-Gal. tins, used, good condition, 2 to case.....	50c per case
5-Gal. tins, NEW, 2 tins to wood case.....	\$1.35 per case

WHITE FLINT GLASS, WITH GOLD LACQD. WAX-LINED CAPS.	
8-oz. Honey Capacity, Cylinder style.....	\$1.50 carton of 3 doz.
16-oz. Honey Capacity, Table Jar style.....	\$1.40 carton of 2 doz.
Quart or 3-lb. Honey Capacity, Mason Style.....	\$1.00 carton of 1 doz.

HOFFMAN & HAUCK, INC.

Woodhaven, New York

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Bees and Bee Supplies

RECOMMENDED cheerfully because used successfully by leading beemen for over 40 years. Safe arrival of shipments guaranteed. Order NOW.

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W. T. Falconer Mfg. Co., Falconer, N. Y.

"where the best beehives come from."

Honey Producers, Take Notice

Do you realize it is only a short time until your bees will be taken out of winter quarters? Have you thought about supplies for next season? Do not wait until swarming time for that means dollars out of your pocket. Order your supplies NOW.

We manufacture and carry in stock a complete line of Bee Supplies ready for prompt shipment. Send us a list of the supplies you wish to purchase and we will be pleased to quote you our prices. Our 1921 descriptive catalog and price list is now ready for mailing. Send us your name and address and we will mail it to you.

August Lotz Company, Boyd, Wisconsin

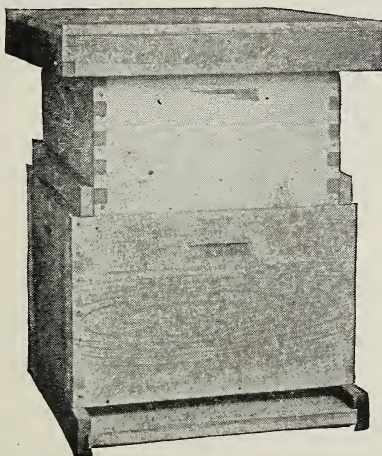
Your present brood equipment can be put above the Modified Dadant hive used as full depth supers.

Features are: Deep frames, large one-story brood nest, frame space ventilation, excellence in wintering, swarming easily controlled.

Glance at this illustration to compare this hive with "Standard" Langstroth hive.

You can get 40 per cent greater brood-comb area than in the "Standard" ten-frame Langstroth.

Modified Dadant Hive



Modified Dadant Hive Features.

1. Eleven frames, Langstroth length, Quinby depth.

2. Frames spaced $1\frac{1}{2}$ inches for swarm control.

3. Extracting frames $6\frac{1}{4}$ inches deep.

4. Dovetailed body, regular reversible bottom and metal roof cover with inner cover.

5. Langstroth "Standard" equipment easily used with this hive.

For free booklet write any distributor of Lewis "Beeware," or to

G. B. Lewis Company - - - - - Watertown, Wisconsin
Dadant & Sons - - - - - Hamilton, Illinois

Thagard's Italian Queens Bred for Quality

My three-banded queens are bred from imported stock; they are hardy, prolific, gentle, disease-resisting, and honey producers. A good queen is the life of any colony; head your colony with some of our queens, place our queens against any queen you may obtain anywhere, and note the results. Book your order now for the latter part of April and May delivery.

	April 1st	to July 1st.	
	1	6	12
Untested	\$2.00	\$8.00	\$15.00
Select Untested	2.25	10.00	18.00
Tested	3.00	16.00	28.00
Select Tested	5.00	25.00	50.00

Safe arrival, pure mating,
and perfect satisfaction guaranteed. Circular free.

V. R. Thagard
Greenville, Ala.

"Best" Hand Lantern



A powerful portable lamp, giving a 300 candle power pure white light. Just what the farmer, dairyman, stockman, etc. needs. Safe—Reliable—Economical—Absolutely Rain, Storm and Bug proof. Burns either gasoline or kerosene. Light in weight. Agents wanted. Big Profits. Write for Catalog. **THE BEST LIGHT CO.**

306 E. 5th St., Canton, O.

INDIANOLA APIARY

will furnish 3-banded Italian bees and queens: Untested queens, \$1.00 each; tested, \$1.50 each. One pound bees, no queen, \$2.00. No disease.

J.W.SHERMAN, VALDOSTA, GA.

NEW ENGLAND

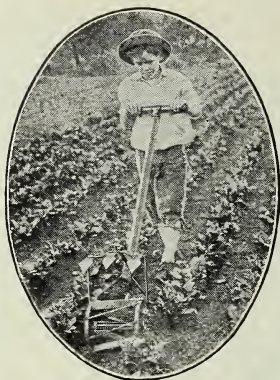
BEEKEEPERS will find a complete stock of up-to-date supplies here. Remember we are in the shipping center of New England. If you do not have a 1921 catalog send for one at once.

H. H. Jepson, 182 Friend St., Boston 14, Mass.

ROOT'S BEE SUPPLIES.

I can make immediate shipment for early orders, and you can get the discount by ordering early.

A. M. MOORE, Zanesville, Ohio.
22 $\frac{1}{2}$ South 3rd St.



Completely Destroys the Weed Growth

More than that, the BARKER breaks the hardest crust into a level, porous, moisture-retaining mulch—all in the same operation.

A ten-year-old boy can run it—do more and better work than ten men with hoes. Saves time and labor, the two big expense items.

BARKER WEEDER, MULCHER AND CULTIVATOR

Eight reel blades revolve against a stationary underground knife—like a lawn mower. Best Weed Killer Ever Used." Works right up to plants. Cuts runners. Aerates the soil. Has leaf guards, and shovels for deeper cultivation—3 garden tools in 1.

FREE ILLUSTRATED BOOK

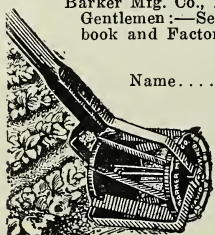
Tells how gardeners and fruit-growers everywhere are reducing their work; increasing their yields.—How to bring growing plants through a dry season.—How to conserve the moisture and force a larger, more rapid growth. Send TODAY for this free, illustrated book and special Factory-to-User offer.

BARKER MANUFACTURING COMPANY

Dept. 23.

David City, Neb.

Barker Mfg. Co., Dept. 23, David City, Neb.
Gentlemen:—Send me postpaid your free book and Factory-to-User offer.



Name.....

Town.....

State.....

R. F. D. or Box.....

Two Thousand Nuclei For Spring Delivery

A great many progressive beekeepers of today buy nuclei to make up winter losses, or in the form of pound packages to strengthen weak colonies. We know this is a good investment, and for a good many years have raised bees in the South, sending them north to catch the honey flow in July and August. It is our policy, in furnishing our customers with bees from our southern apiaries, to furnish bees that give satisfaction to you, as they have to us for the past ten years. We are very particular as to the strain of bees we keep, and the rearing of our queens is in the hands of an expert.

We maintain that the queen is the life of the colony, and they are reared under the most favorable conditions, that of natural swarming, and they are fine large ones with energy to spare, and as good as money can buy. However, we do not sell queens, but we see that a good queen goes with every nucleus we sell. We guarantee you safety against disease, as our bees are inspected constantly, and our apiaries closely watched to see that no disease appears. Our prices as follows:

	April	May	June
1-frame nucleus	\$4.00	\$3.50	\$3.00
2-frame nucleus	5.50	5.00	4.50
3-frame nucleus	7.00	6.50	6.00
4-frame nucleus	9.00	8.50	8.00

Full colonies of bees, \$12.00 per colony

1-pound package	\$2.50
2-pound package	4.50
3-pound package	6.50

For packages with queens add \$1.50 for each package.

**WEBER BROS.
HONEY CO.
RIALTO, CALIFORNIA**

Quality Bee Supplies From a Reliable House

¶ Without fear or favor I place my BEE SUPPLIES and SERVICE before you.

¶ It is the small annoyances that often grow into disastrous results. Avoid the so-called "little losses" by using MONDENG'S goods. Quality is first—save time when you put your goods together by getting supplies that are accurately made. Service is next—no delays when bee supplies are ordered from my factory.

¶ I am ready to meet your urgent needs. Send for my latest price-list.

¶ Closing out all Langstroth and Wisconsin hives and supers. Also Langstroth triangular top-bar frames, and eight-frame D. T. supers for 4 x 5 sections. At cost price, write for quotations.

Charles Mondeng

146 Newton Ave. N. &
159 Cedar Lake Road.

MINNEAPOLIS, MINNESOTA.

BEE SUPPLIES



We are prepared to give you value for your money. Our factory is well equipped with the best machinery to manufacture the very best bee supplies that money can buy. Only the choicest material suitable for beehives is used. Our workmanship is the very best. Get our prices and save money.

**EGGERS BEE SUPPLY
MFG. COMPANY, INC.**

Eau Claire, Wis.

Beeswax Wanted

In big and small shipments, to keep Buck's Weed-process foundation factory going. We have greatly increased the capacity of our plant. We are paying higher prices than ever for wax. We work wax for cash or on shares.

Root Bee Supplies

Big stock, wholesale and retail. Big catalog free.

Carl F. Buck

The Comb-foundation Specialist

August, Kansas

Established 1899.

EVERY SHEET THE SAME

As alike as peas in a pod—only more so. That is a distinguishing feature of my comb foundation. Accuracy is my watchword. My foundation is not left with the natural milled edge, but every edge is trimmed with an absolutely straight, smooth cut, and always measures right to the dot, no matter what the size ordered.

This accurate trimming not only expedites placing the foundation in the frames, but also permits of such close packing for shipment that there is no chance for it to chuck around, thus jamming the edges.

Although this extra trimming adds to the cost of manufacture, still my prices are lower than others.

Your own wax worked into foundation at lowest rates. Send for complete price list.

E. S. Robinson

Mayville, Chautauque Co., N. Y.

Forehand's Queens

They Satisfy---Why?

Because of 28 years of experimental work, with both queen-breeding and honey-production. With breeding and selecting of imported queens, I have reached a standard which is ideal. Queens as good, but none BETTER. Why experiment? Take advantage of the life experience of my breeders.

OUR SERVICE STATION—We are ready to serve you at all times, whether you desire queens or advice. Let us help you with your bee problems. All questions are cheerfully answered.

I breed three-banded Italians only. Nov. 1st to June 1st.

	1	6	12
Untested	\$2.00	\$ 9.00	\$16.00
Selected Untested	2.25	10.50	18.00
Tested	3.00	16.50	30.00
Selected Tested	3.50	19.50	36.00

Bees in two-pound packages, 1 package, \$6.00; 25 or over, \$5.80; 50 or over \$5.40; 100 or over, \$5.00, without queens. Will begin shipping bees as early as weather will permit.

Orders booked now for spring delivery. One-fourth the full amount with order and balance when shipment is desired. Pure mating, safe arrival, and perfect satisfaction guaranteed. Write for circulars and large-order discounts. Foreign orders at receiver's risk.

N. Forehand, Ramer, Alabama



QUEENS AND BEES



Mr. Beekeeper, we are establishing one of the most modern queen-rearing outfits in the U. S. A. If you want good quality, quick service, prompt attention, and perfect satisfaction, don't fail to place your orders with us on time as we fill orders in rotation. Our queens are bred by experienced queen-breeders; they are reared by the latest and most approved method and from the very best honey-gathering strain of Italians obtainable. Our experience from boyhood up under our father (who had fifty years of experience with bees) thus enables us to produce queens as good as can be produced, but none better, and we sell at figures that will sustain the high quality of our queens. Our bees are hardy, gentle, prolific, disease-resistant and honey-gatherers. Each and every queen that leaves our yard is inspected by us personally and all inferior ones are killed.

Prices April, May, and June:	1	6	12	100
Untested Queens	\$1.50	\$ 8.00	\$15.00	\$100.00
Select Untested Queens	1.75	9.25	16.50	115.00
Tested Queens	2.75	13.75	24.50	
Select Tested Queens	3.50 each			

— BEES —

We ship only 2-lb. packages by express F. O. B. shipping point, \$5.00 each; 25 or more, \$4.75 each. Add prices of queens wanted. We guarantee pure mating, safe arrival, and free from all diseases in U. S. A. and Canada. Remember you take no risk when you deal with us. Isn't that enough said? Reference, Bank of Ramer, Ramer, Ala.

The Norman Brothers Apiaries
Naftel, Alabama

ITALIAN BEES & QUEENS OF PURE THREE-BAND STOCK

Bred from best hustlers, by methods that years of experience has taught us are best, including the use of large, strong nuclei, which insures young queens emerging strong and vigorous. Safe arrival in U. S. and Canada. Health certificate with each shipment. Satisfaction guaranteed.

Untested 1 to 12, \$1.50 each. Over 12, \$1.25 each

Select Untested 1 to 12, \$1.75 each. Over 12, \$1.50 each

Tested 1 to 12, \$2.50 each. Over 12, \$2.25 each

Select Tested, suitable for breeders.....\$5.00 each

Two-frame nuclei, \$5.00. Three-frame nuclei, \$7.00; add price of queen wanted with each. Eight-frame colony, \$15.00. Ten-frame colony, \$17.50. Standard equipment all around, and wired frames.

JENSEN'S APIARIES, CRAWFORD, MISS., R. F. D. No. 3.



This photograph shows four types of clover which were seeded with spring wheat. The wheat was cut off and the clover allowed to grow until September when it was cut. At the extreme right is ordinary red clover, next is yellow biennial sweet clover, next is white biennial sweet clover, and in the center is the white annual sweet clover whose seed we offer you. This shows how rapidly this legume grows.

THE GREATEST CLOVER FOR BEES!

This Annual White Sweet Clover blooms for bees in three or four months and continues to bloom for a much longer period than most plants used for the purpose. Many beekeepers have used it and say that it is the greatest clover yet tried. Quick growth, and a great wealth of honey-making blooms.

This is the clover that was discovered by Prof. Hughes of the Iowa State Agricultural Experimental Station at Ames, Iowa, and has frequently been described in the editorial columns of this publication. It matures in a single year, so that blossoms for bees, hay or seed may be had in one season. It provides quickly a rank growth for plowing under. Now for \$1 you can try out this seed on your farm under your own conditions and see what it will do. For \$1 you can learn the facts about this new and better clover for bees.

We have a quantity of the seed and will sell a trial package of 14,000 seeds for \$1—enough to test it out thoroughly. The package is sealed and guaranteed pure annual sweet clover seed of the Hughes variety. It should produce half a bushel of seed if you take care of the crop properly. Inquiry is solicited for larger amounts.

Pin \$1 bill to this advertisement. Attach your name and address. The package of seed and the booklet explaining the whole proposition will be sent you by return mail.

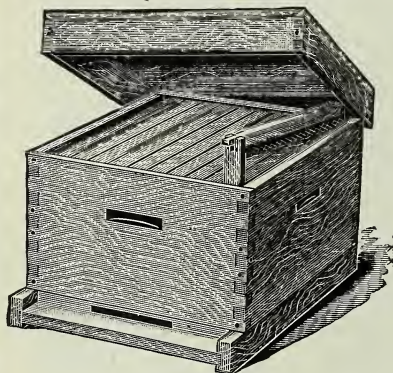
We are growers of Selected Evergreen Sweet Corn and Perfection Alaska and Perfection Garden Wrinkled Peas. They are high quality with an especially high germination test.

THE DE GRAFF FOOD COMPANY, De Graff, Ohio

WHY QUALITY COUNTS

Metal Covers

1. Double cover of metal and wood, absolutely rain-proof and cannot warp.
2. Air space between metal and wood makes the poorest known conductor of heat, thus helping to make the hive cool in summer, and warm in winter.
3. Will last a lifetime if properly cared for.
4. Does not easily blow off in a wind—sticks like glue to the hive.



Hive Body

1. Full 25/32 White Pine, free from knots, perfectly dried and carefully cut and milled.
2. Lock corner of $\frac{1}{2}$ inch at top and bottom, preventing splitting and contributing to the strength of the body.
3. Light weight, yet strong and durable.

Reversible Bottom

1. Made of strong heavy cypress, which will not rot.
2. Matched, tongued and grooved with grain crossed, fitted into strong end cleats, which prevents warping.
3. Reversible $\frac{3}{8}$ -inch bee space for winter; $\frac{7}{8}$ -inch for summer.
4. Automatic entrance cleats, providing a small entrance for winter, medium for spring and fall, which can be removed entirely in summer.

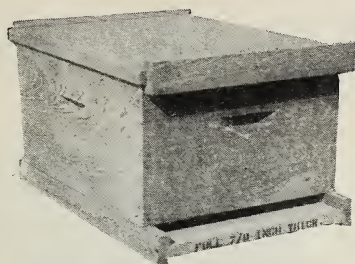
All of these points of quality are to be found in a Root Hive. That's

Why Root Hives Pay.

THE A. I. ROOT CO. OF IOWA.

Council Bluffs, Iowa

Hives from the Wood Eternal



\$16.00 for five complete. Send for catalogue.

ITALIAN BEES AND QUEENS

Three-banded ITALIAN QUEENS reared from the best mothers under favorable conditions, by careful breeders under the best-known methods. **Guaranteed to be as good as the best, to be free of disease and to give satisfaction.**

Untested, \$2.00; 12 or more, \$1.50 each. Tested, \$3.00 each.

Breeders, \$10.00, \$15.00, and \$25.00 each, shipped in nucleus.

If you want bees and equipment, consider our full COLONIES Italian bees in new painted hives, good combs, young tested queens.

Full Colonies as above, in eight-frame hive.....\$20.00

Full Colonies above, in ten-frame hive.....\$22.00

Beginners' outfits a speciality.

Nuclei

All our nuclei are furnished on good combs well filled with brood and a good supply of young bees.

One-frame nucleus, no queen\$3.50

Two-frame nucleus, no queen 6.00

Three-frame nucleus, no queen 8.25

Nuclei for Early Shipment

We have 500 two-frame nuclei that we can ship starting April 10th. These will be supplied with young tested queens already introduced to the nucleus and will be first-class in every respect. Order early before they are all gone. With tested queen, \$9.00 each.

One carload of full colonies in eight-frame hives for shipment from Helena, Ga. All have young Italian queens, \$12.50 each.

Our Special Package

We have tried out this package for several years, and it has given good satisfaction. They build up much quicker than a two-pound package. They go thru to destination with little loss of bees, then you have no trouble to get them all established.

One comb of brood with one pound of bees....\$6.00, no queen.

Package Bees

We guarantee safe arrival of all package bees within six days of shipping point.

One-pound package bees, no queen.....\$3.50 each

Two-pound package bees, no queen 6.00 each

Safe arrival and satisfaction guaranteed on everything we sell. Shipment to be made from either Mayhew, Miss., or Helena, Ga.

The Stover Apiaries
Mayhew, Miss.



Now you've heard that first robin, you realize that Spring is here, and that it is time to get in those supplies before the "rush" begins.

What about those veils, smokers, tools, hives, supers, sections, foundation, and extractors? Send us your order, large or small. We will give it our best attention.

DON'T BE APRIL FOOLED

ORDER NOW

F. A. SALISBURY

1631 West Genesee St.
Syracuse, N. Y.

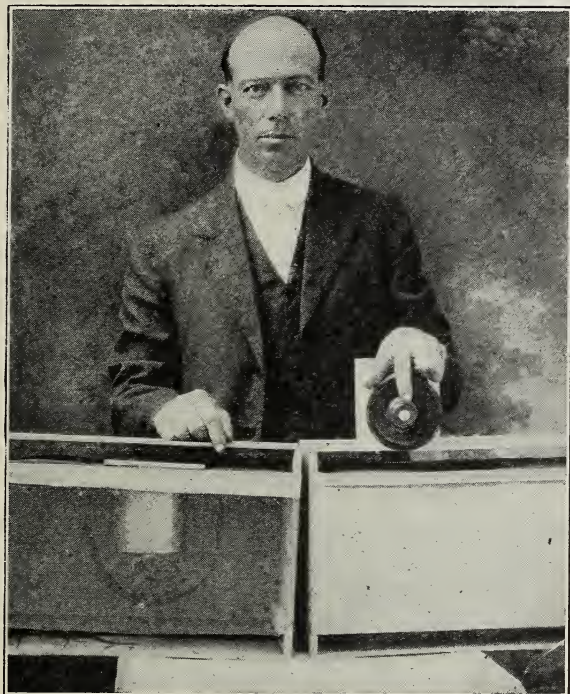
*New York State Beekeepers
Send for our Catalog.*

Bees have wintered well, and we expect a fine crop of honey. Don't lose out by not having your supplies ready. Order now. We can make prompt shipment at present time.

If you haven't our catalog, write us today. We have everything in stock. Write us for quotations. We are here to give you SERVICE.



THE AULT 1921 BEE SHIPPING CAGE



Patent Pending

1st. It is a dark cage, much more so than the open screen cages we have been shipping in in the past.

2nd. The feeder uses pure sugar syrup. Better than Honey or Candy to ship on; it contains water as well as feed.

3rd. Feeders are made more substantial, 1-3 larger, and have screw cap that will not jar out.

4th. Instead of one small hole, we now use a cotton duck washer in the screw cap that has proven to overcome all the objections found to the liquid feed method.

5th. The Cage is one piece screen wire protected by thin boards on the outside. Send for free circular describing the cage in detail, prices, etc.

Queens—Package Bees—Queens

Will book your order with 20 per cent down, balance just before shipping. My Free Circular gives prices in detail, etc. Safe delivery Guaranteed within 6 days of shipping point. We ship thousands of pounds all over U. S. A. and Canada.

1-pound package bees, \$3.00 each, 25 or more \$2.85 each.

2-pound package bees, \$5.00 each, 25 or more \$4.75 each.

3-pound package bees, \$7.00 each, 25 or more \$6.65 each.

F. O. B. Shipping Point. Add price of queen wanted.

1 Untested Queen, \$2.00 each; 25 or more, \$1.75 each

1 Select Unt. Queen, \$2.25 each; 25 or more, \$2.00 each

1 Tested Queen, \$3.00 each; 25 or more, \$2.70 each

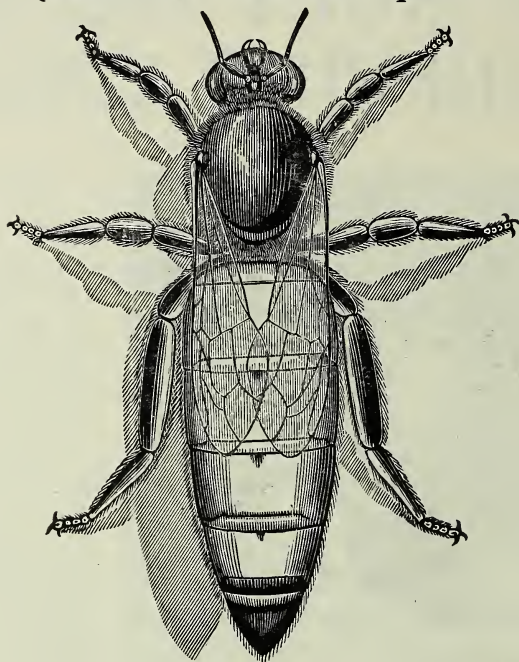
1 Select Tested, \$3.50 each; 25 or more, \$3.00 each

Nueces County Apiaries

E. B. AULT, Prop.

Calallen, Texas

"Queens that are reared to please."



Highest Quality---Prompt Service---Satisfaction

Our Reliable Three-Banded Italian Queens

will be ready by return mail promptly after April 5th. We will have 1500 Nuclei in full operation and can take care of orders by return mail. All orders filled promptly by return mail or money refunded. Requeen your colonies early.

Why Order Farmer Queens?

They are bred by as skillful and experienced queen-breeders as can be found in the United States. There are very few places where queens are reared under as favorable conditions as in our queen-rearing yards. We devote our time to rearing as good queens as possibly can be, and we positively guarantee that no better can be reared; we spare neither labor nor money in developing our strain of Italians. It is our intention to improve our original stock each year and to be more skillful queen-breeders. Our first original stock was procured from the highest quality obtainable, which we have proved to the highest point and is now not surpassed by any. Our own eyes inspect every queen that leaves our yards; no culls sent out. Place your orders, and after you have given our queens a fair test and you are not satisfied in any way that they are as good as any just return them and queens to take their money. They are very the very best for You take no risk in safe arrival in satisfaction is left prompt service given queen guaranteed to

OUR PRICES

	1	6	12	100
Untested	\$1.50	\$8.00	\$15.00	\$100.00
Select Untested	1.75	9.50	17.00	120.00
Tested	3.00	14.75	25.00	
Select Tested.	4.00	23.00	42.00	

Write for prices on larger quantities than 100.

every way that they you have ever used, we will send you places or return your resistant to diseases, honey-gathering, buying our queens; U.S.A. and Canada; entirely to purchaser; to all orders; every be purely mated.

The Farmer Apiaries, Ramer Alabama

Where the Good Queens Come From.

ACCOMPLISHED

1500 Colonies of Bees
Wintered Without a
Single Loss!



The colonies are in excellent condition, many of them stronger than they were last fall. The bees are the most vigorous we have ever seen. Our stock is already noted for its hardiness, resistance to bee-disease, and honey gathering qualities.

We are prepared to furnish bees from this stock in full colonies or nuclei. Bees in pound packages for June delivery. Consult our catalog for prices and other information.

We were successful in obtaining breeding queens direct from Italy last season. We will be in position to furnish daughters from this imported stock during the coming season. Write for particulars.

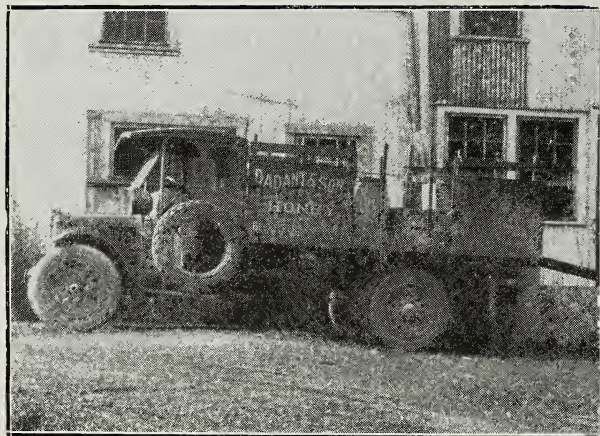


THE A. I. ROOT COMPANY
MEDINA, OHIO

Over 50 years in the bee industry

The Dadant Foundation Factory

requires many thousand pounds of beeswax to keep running full force. The accompanying photograph shows a truckload of beeswax being unloaded at the foundation factory.



There were shipments from 62 different parties, coming in by freight, express, parcel post, and by boat.

So carefully checked, weighed, and cared for are these that it is a rarity to have a lost shipment, a complaint of weights, or dissatisfaction in any way. Some wish cash, some bee supplies, but most want DADANT'S FOUNDATION.

The same care is used throughout the process of Dadant Foundation manufacture, packing, and shipping.

As much pains is taken to be correct and give satisfaction with a one-pound lot as with a two-ton shipment. Satisfaction guaranteed.

DADANT'S FOUNDATION is NOT the quick invention of a week's or a month's time.

BUT it is the evolution of years of time combined with the test of new methods variously tried and painstakingly improved; and the finished product put to a thorough test on a large scale.

DADANT'S FOUNDATION--Every inch, every pound, every ton equal to any sample we have ever sent out. Specify it to your dealer. If he hasn't it, write us.

Dadant & Sons

Hamilton, Illinois

Catalog and Prices on Bee Supplies, Beeswax, Wax Working into Comb Foundation and Comb Rendering for the asking.